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(54) METHOD AND APPARATUS FOR REPRODUCING DATA FROM RECORDING MEDIUM USING LOCAL STORAGE

(76) Inventors: **Kang Soo Seo**, Anyang-si (KR); **Jea Yong Yoo**, Seoul (KR); **Byung Jin Kim**, Seongnam-si (KR)

Correspondence Address:
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 8910
RESTON, VA 20195 (US)

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(57) **ABSTRACT**

An apparatus for reproducing data recorded on a recording medium includes a pickup unit, a local storage, and a controller. The pickup unit reads a disc package from the recording medium, and the local storage stores a local storage package associated with the disc package. The controller generates control signals to display metadata information of the local storage package, and to generate a binding unit from the local storage package. The binding process is performed according to binding information which is modified by a user with reference to the displayed metadata information. The controller finally generates a virtual package by binding the binding unit with the disc package according to the modified binding information.

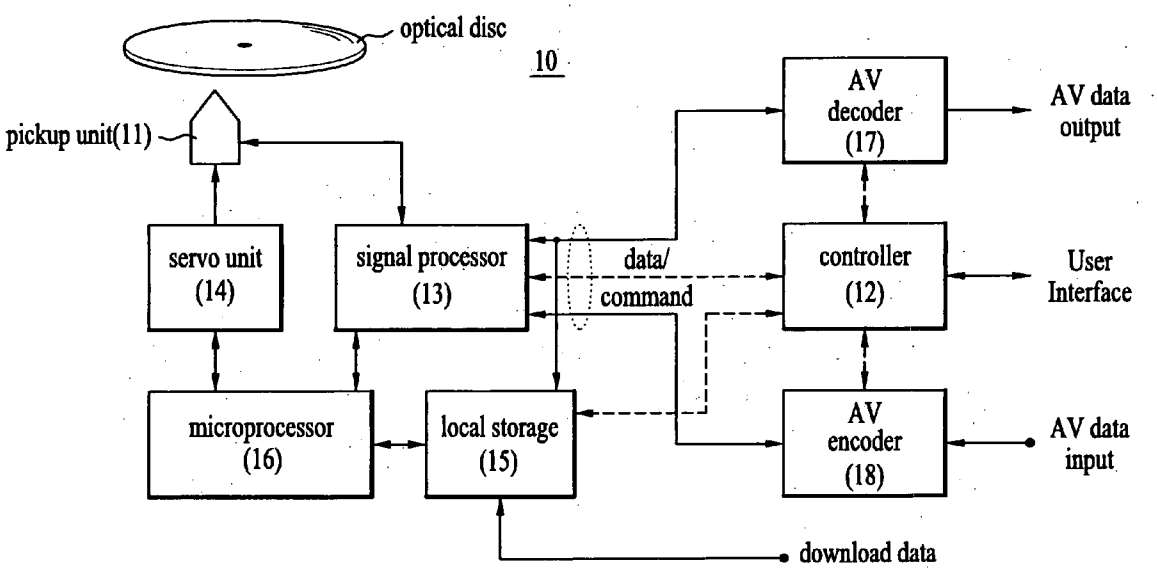


FIG. 1

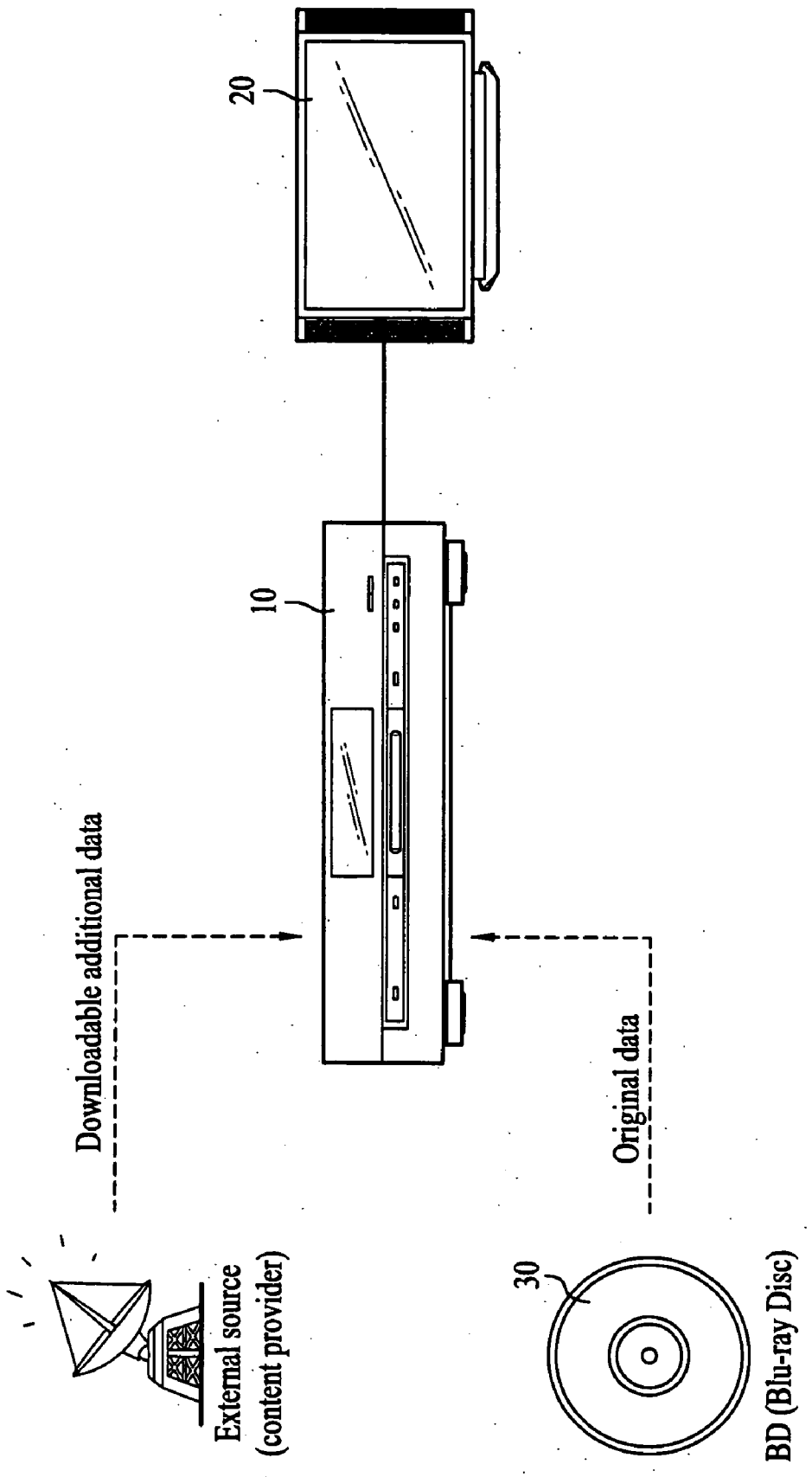

20
10
Downloadable additional data
Original data
External source
(content provider)
30
BD (Blu-ray Disc)

FIG. 2

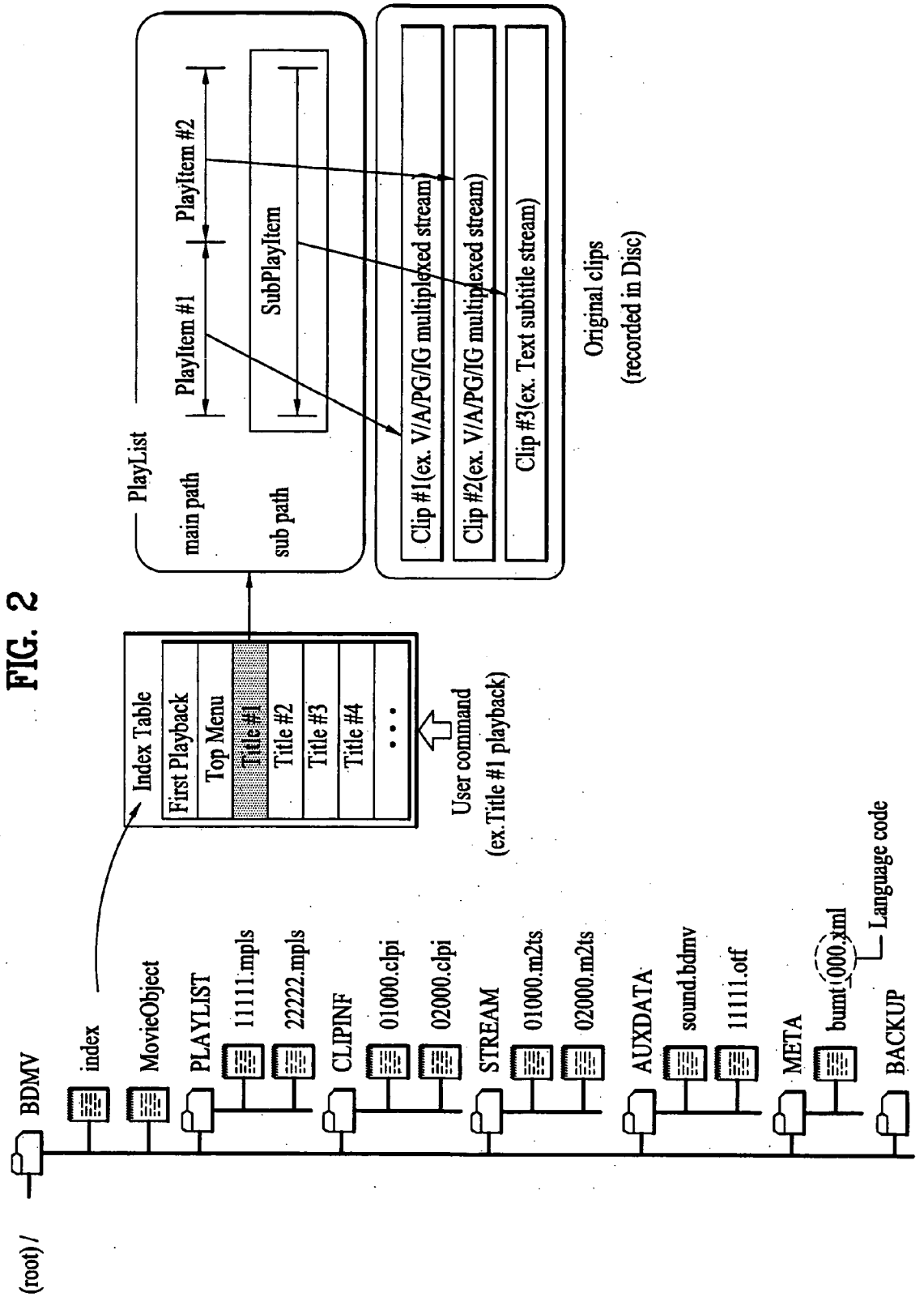

(root) /
BDMV
index
MovieObject
PLAYLIST
11111.mpls
22222.mpls
CLIPINF
01000.clpi
02000.clpi
STREAM
01000.m2ts
02000.m2ts
AUXDATA
sound.bdmv
11111.otf
META
bumt_000.xml
Language code
BACKUP
Index Table
First Playback
Top Menu
Title #1
Title #2
Title #3
Title #4
• • •
User command
(ex.Title #1 playback)
PlayList
main path
sub path
PlayItem #1
PlayItem #2
SubPlayItem
Clip #1(ex. V/A/PG/IG multiplexed stream)
Clip #2(ex. V/A/PG/IG multiplexed stream)
Clip #3(ex. Text subtitle stream)
Original clips
(recorded in Disc)

FIG. 3

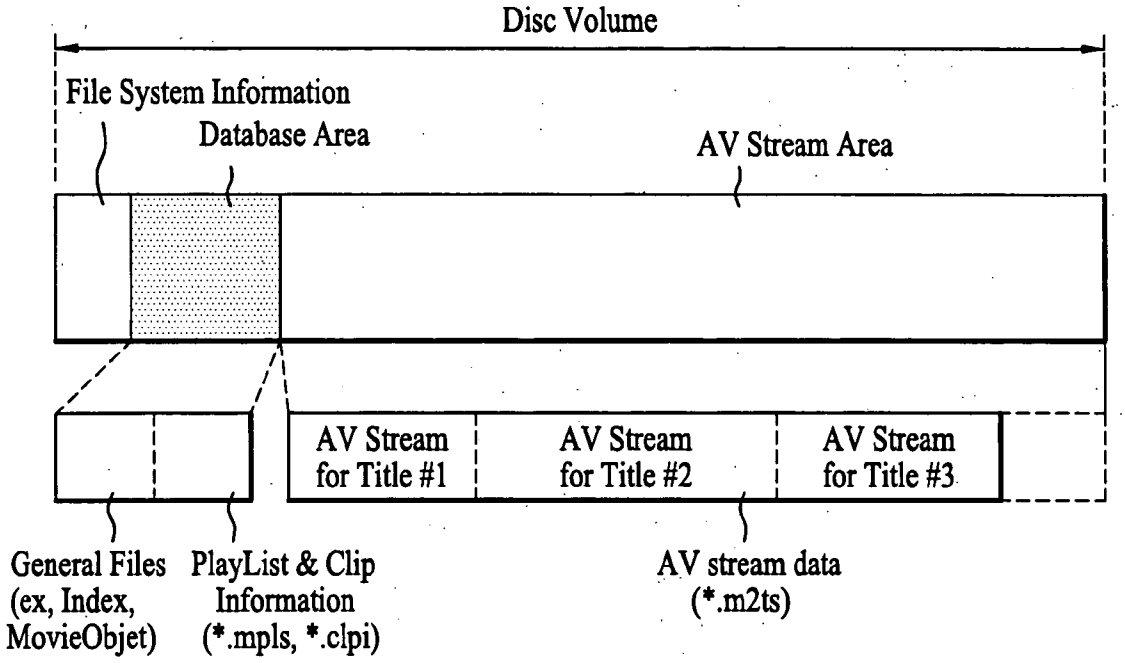

Disc Volume
File System Information
Database Area
AV Stream Area
AV Stream for Title #1
AV Stream for Title #2
AV Stream for Title #3
General Files (ex, Index, MovieObjet)
PlayList & Clip Information (*.mpls, *.clpi)
AV stream data (*.m2ts)

FIG. 4A

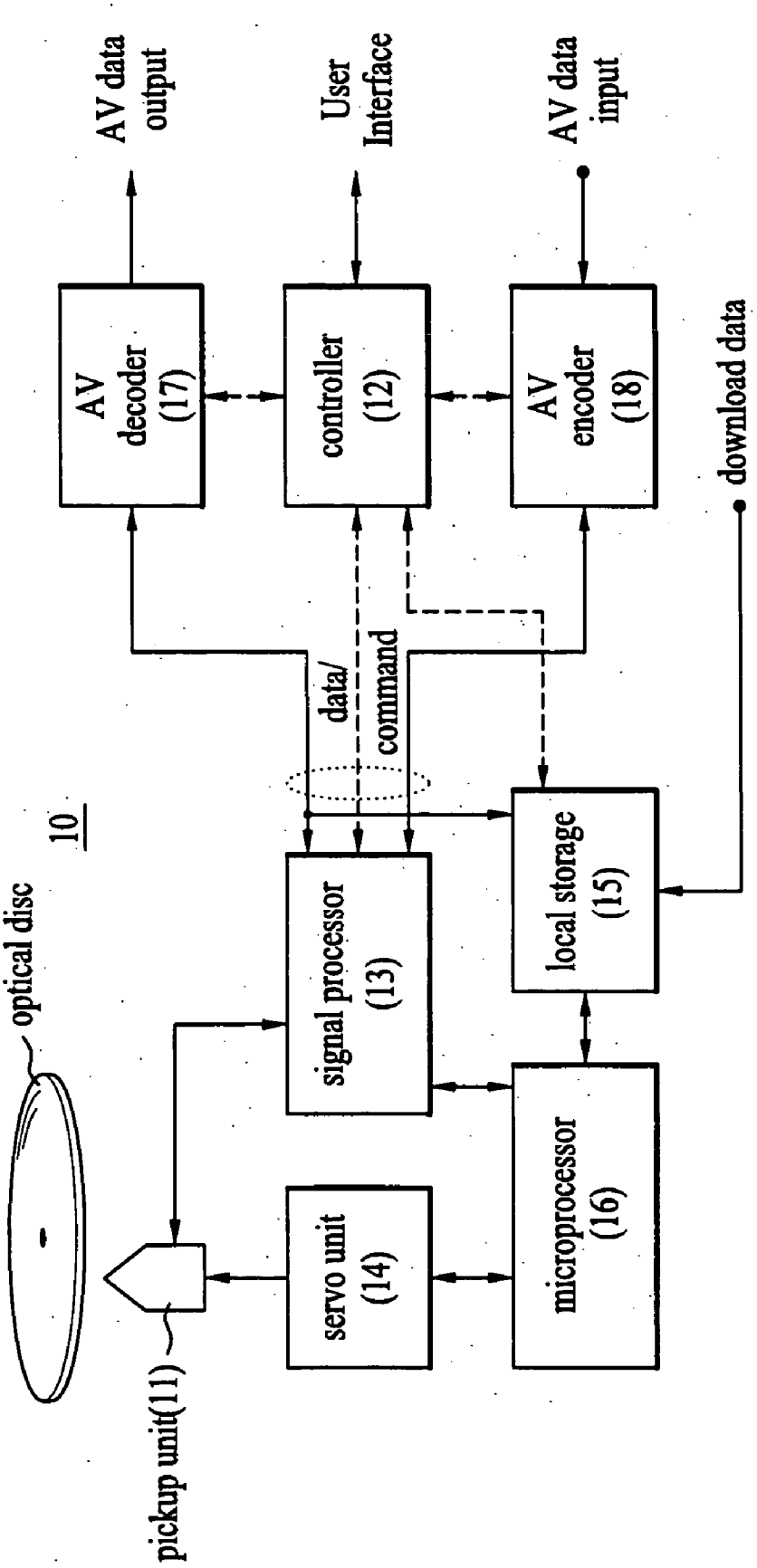

AV data output
User Interface
AV data input
AV decoder (17)
controller (12)
AV encoder (18)
download data
data/ command
10
optical disc
signal processor (13)
local storage (15)
servo unit (14)
microprocessor (16)
pickup unit(11)

FIG. 4B

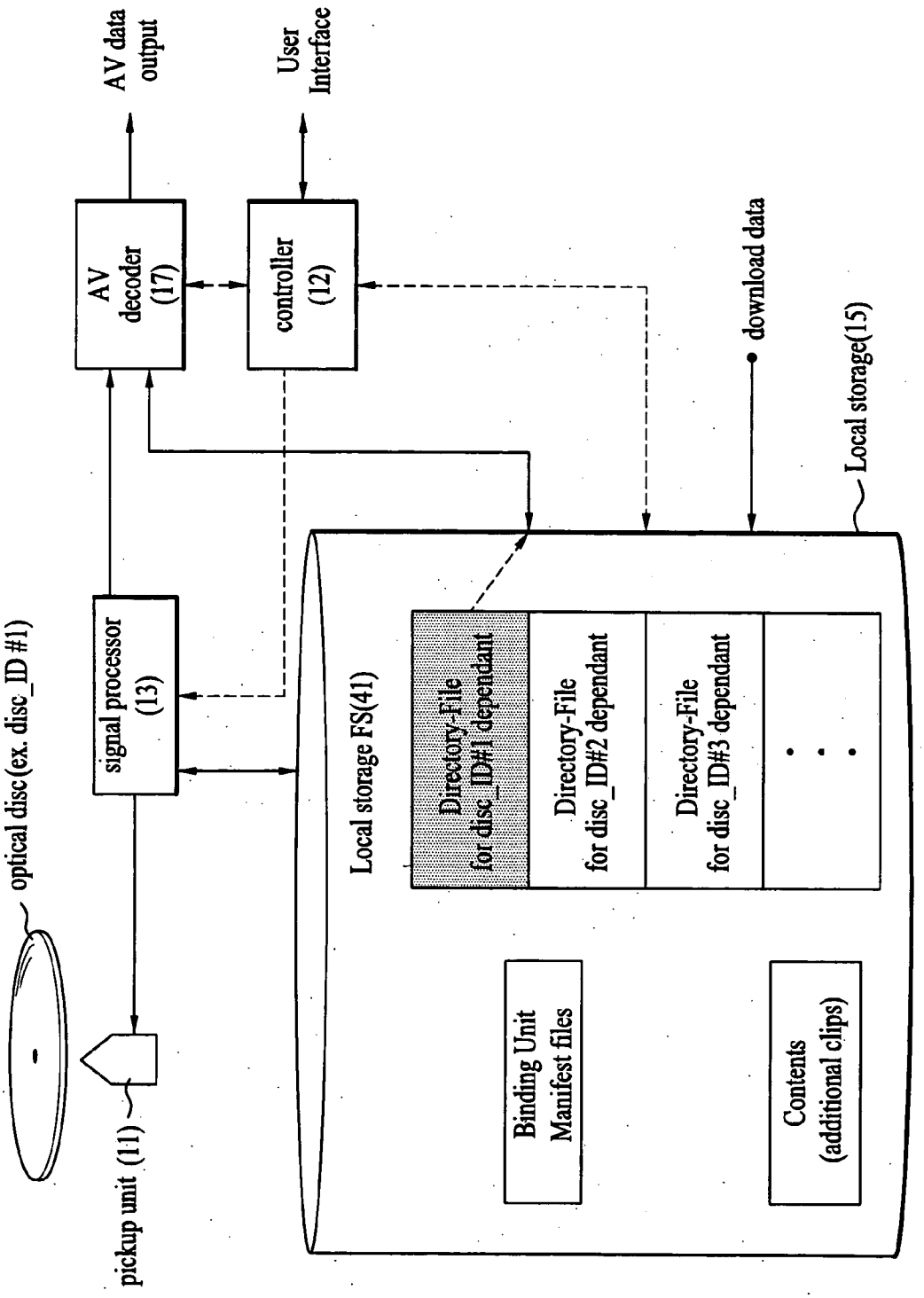

AV data output
User Interface
AV decoder (17)
controller (12)
download data
Local storage(15)
optical disc (ex. disc_ID #1)
signal processor (13)
Local storage FS(41)
Directory-File for disc_ID#1 dependant
Directory-File for disc_ID#2 dependant
Directory-File for disc_ID#3 dependant
Binding Unit Manifest files
Contents (additional clips)
pickup unit (11)

FIG. 5

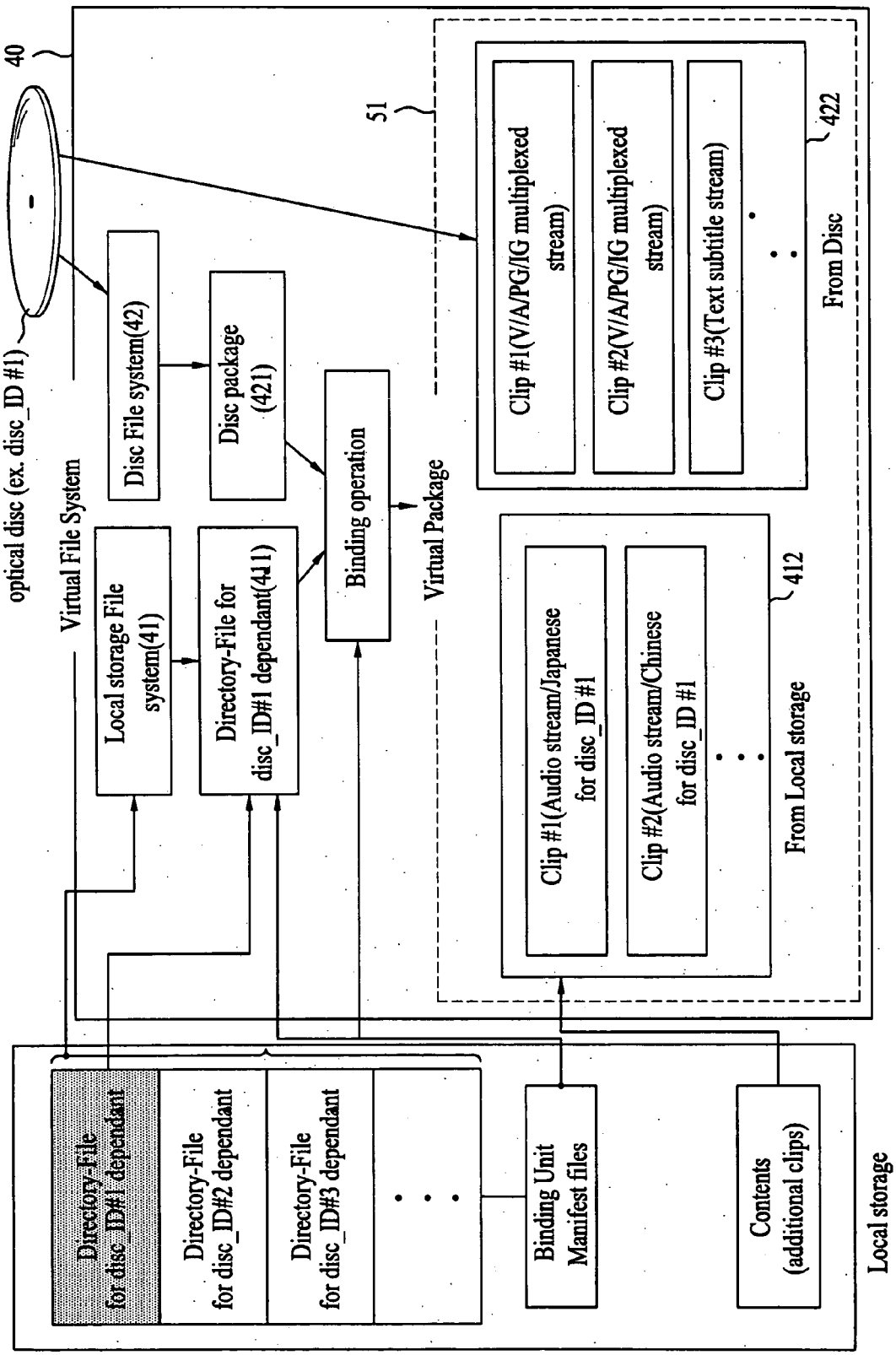

40
optical disc (ex. disc_ID #1)
Virtual File System
Disc File system(42)
Local storage File system(41)
Directory-File for disc_ID#1 dependant(411)
Disc package (421)
Binding operation
Virtual Package
51
Clip #1(V/A/PG/IG multiplexed stream)
Clip #2(V/A/PG/IG multiplexed stream)
Clip #3(Text subtitle stream)
422
From Disc
Clip #1(Audio stream/Japanese for disc_ID #1
Clip #2(Audio stream/Chinese for disc_ID #1
412
From Local storage
Directory-File for disc_ID#1 dependant
Directory-File for disc_ID#2 dependant
Directory-File for disc_ID#3 dependant
Binding Unit Manifest files
Contents (additional clips)
Local storage

FIG. 6

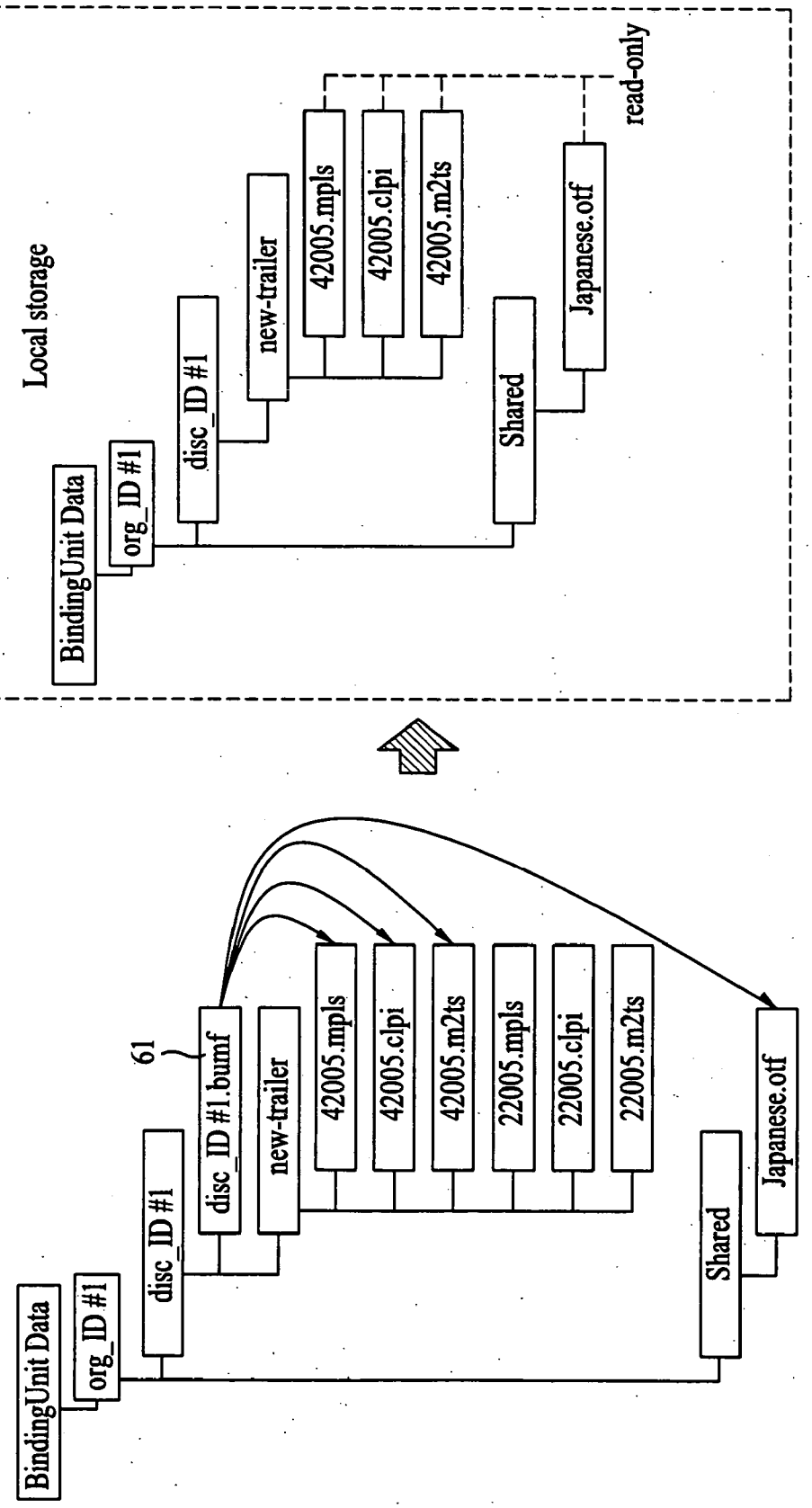

62
Binding Unit of disc_ID #1
Local storage
read-only
BindingUnit Data
org_ID #1
disc_ID #1
new-trailer
42005.mpls
42005.clpi
42005.m2ts
Shared
Japanese.otf
61
disc_ID #1.bumf
22005.mpls
22005.clpi
22005.m2ts

FIG. 7

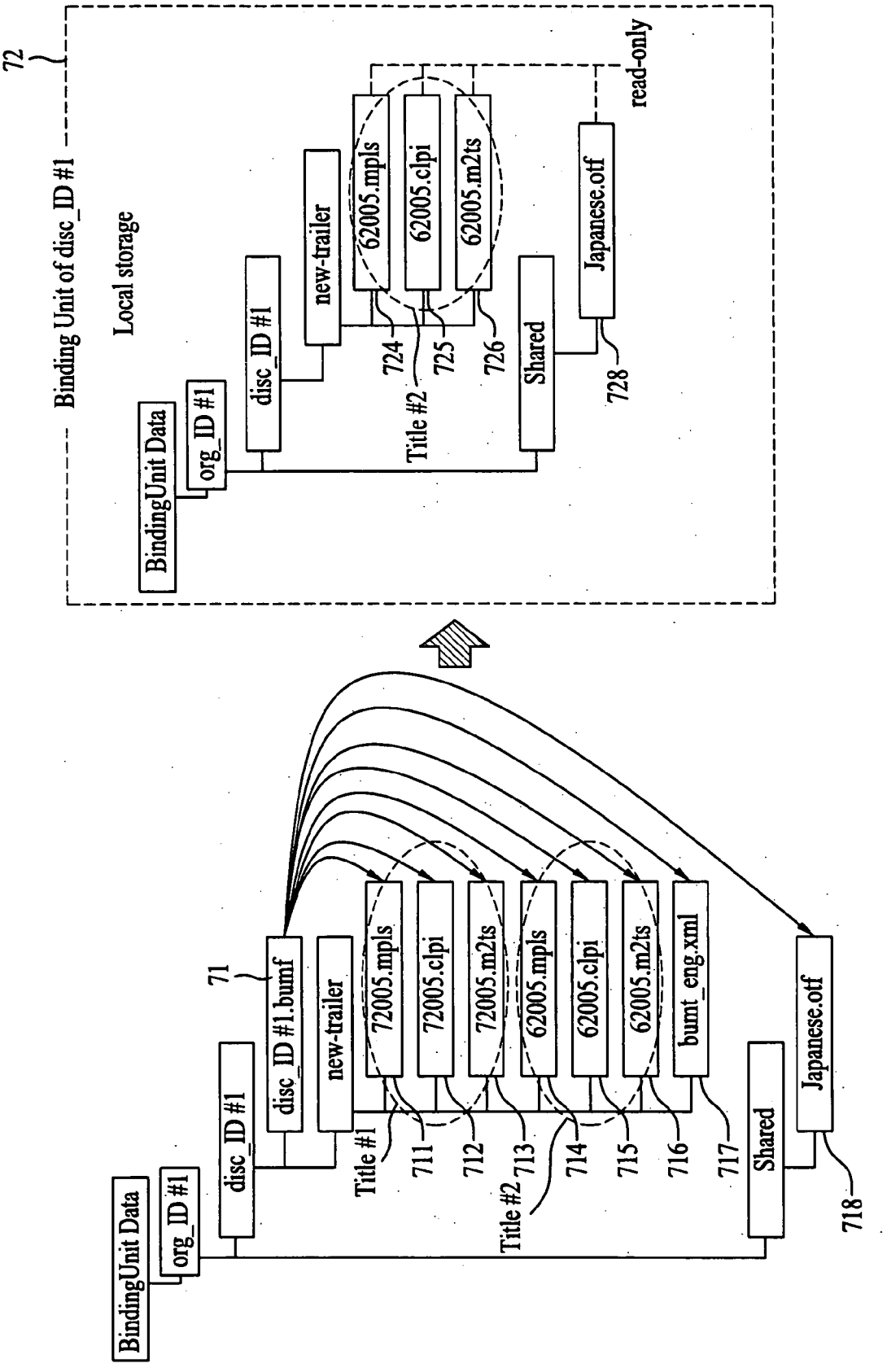

72
Binding Unit of disc_ID #1
Local storage
read-only
BindingUnit Data
org_ID #1
disc_ID #1
new-trailer
62005.mpls
62005.clpi
62005.m2ts
Japanese.otf
Shared
Title #2
724
725
726
728
71
disc_ID #1.bumf
72005.mpls
72005.clpi
72005.m2ts
62005.mpls
62005.clpi
62005.m2ts
bumt_eng.xml
Title #1
Title #2
711
712
713
714
715
716
717
718

FIG. 8

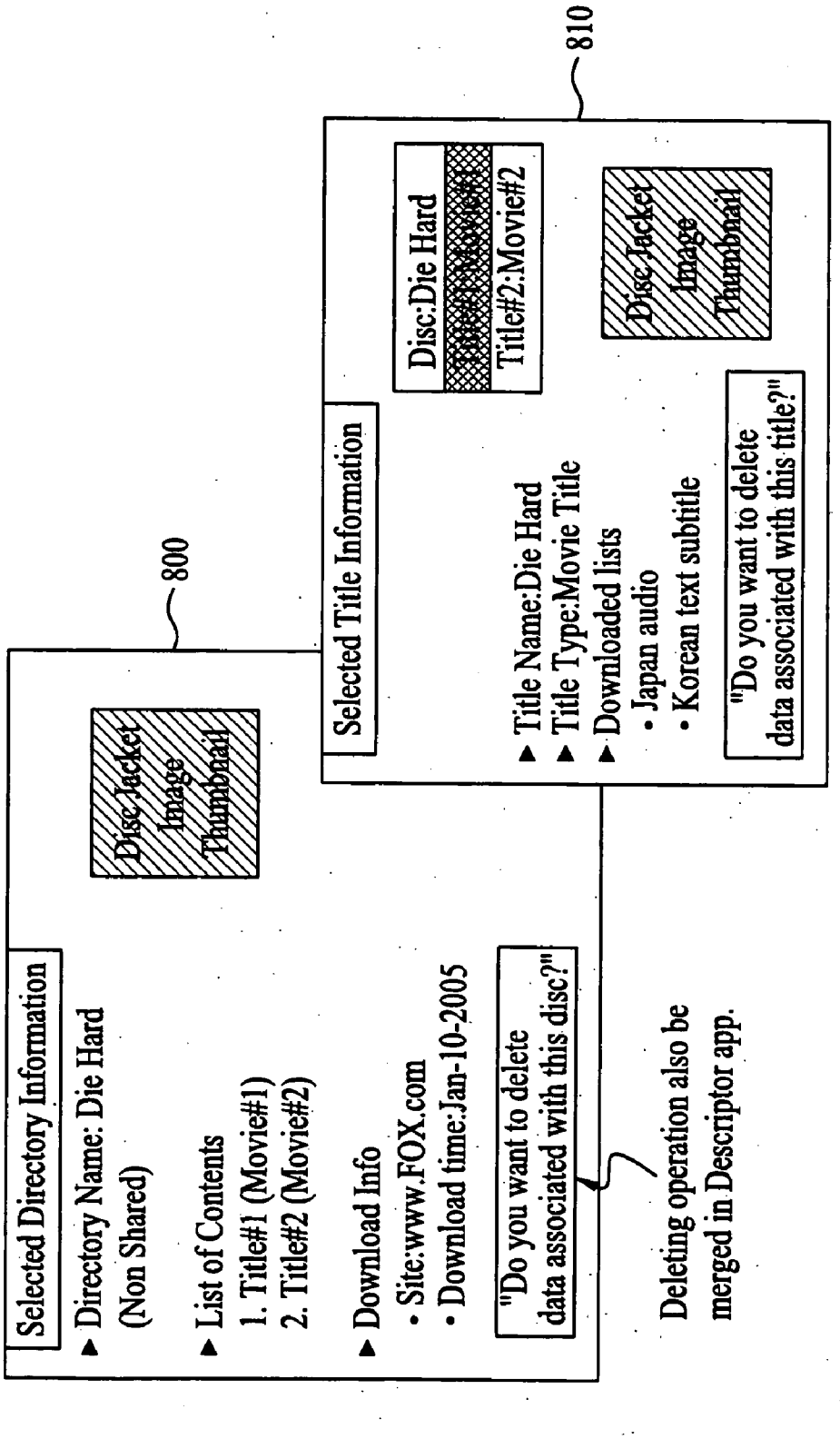

Selected Directory Information
▲ Directory Name: Die Hard (Non Shared)
▲ List of Contents
1. Title#1 (Movie#1)
2. Title#2 (Movie#2)
▲ Download Info
• Site:www.FOX.com
• Download time:Jan-10-2005
"Do you want to delete data associated with this disc?"
Disc Jacket Image Thumbnail
800
Selected Title Information
▲ Title Name:Die Hard
▲ Title Type:Movie Title
▲ Downloaded lists
• Japan audio
• Korean text subtitle
"Do you want to delete data associated with this title?"
Disc:Die Hard
Title#2:Movie#2
Disc Jacket Image Thumbnail
810
Deleting operation also be merged in Descriptor app.

FIG. 9

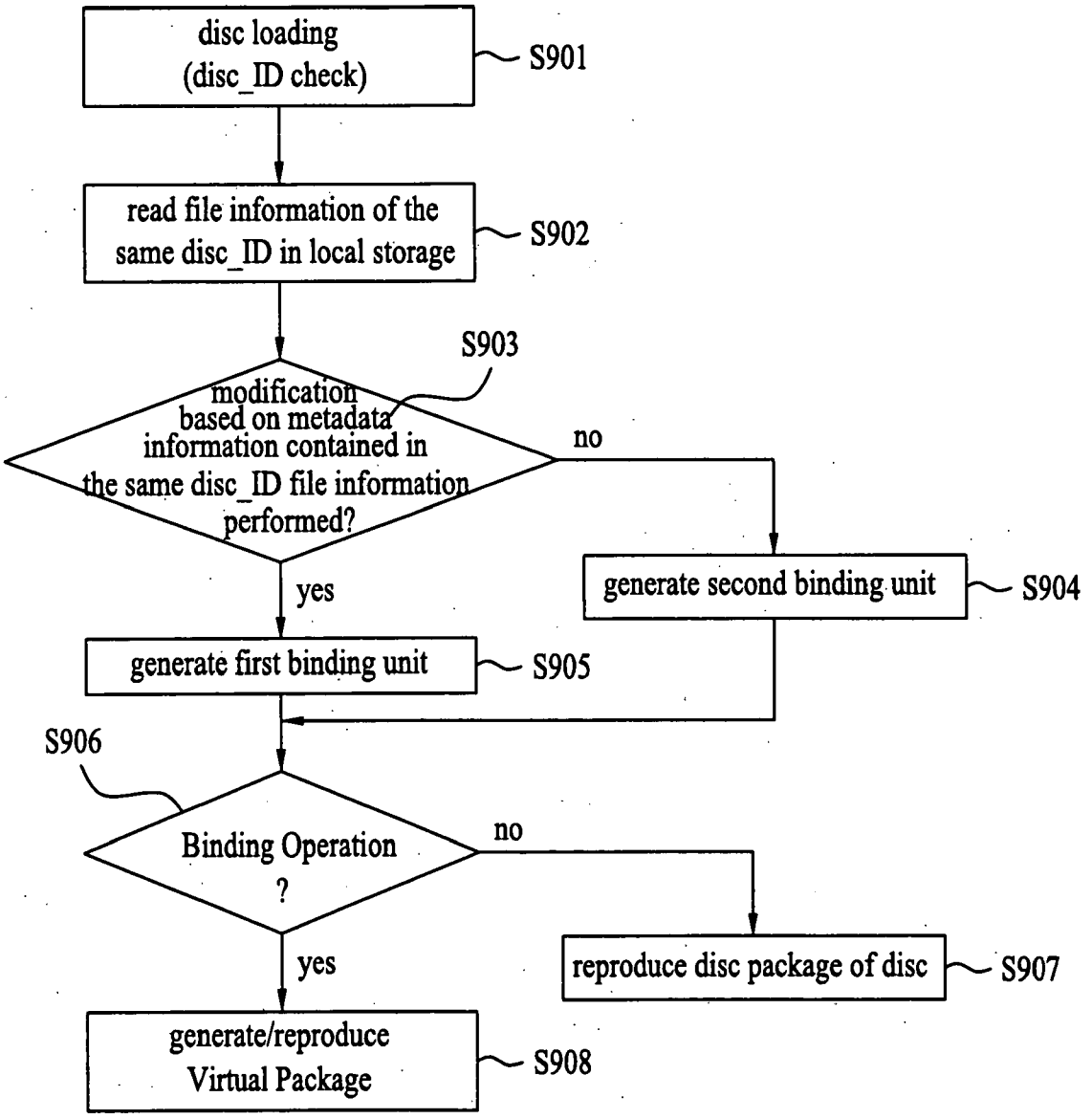

disc loading
(disc_ID check)
S901
read file information of the
same disc_ID in local storage
S902
S903
modification
based on metadata
information contained in
the same disc_ID file information
performed?
no
yes
generate second binding unit
S904
generate first binding unit
S905
S906
Binding Operation
?
no
yes
reproduce disc package of disc
S907
generate/reproduce
Virtual Package
S908

FIG. 10

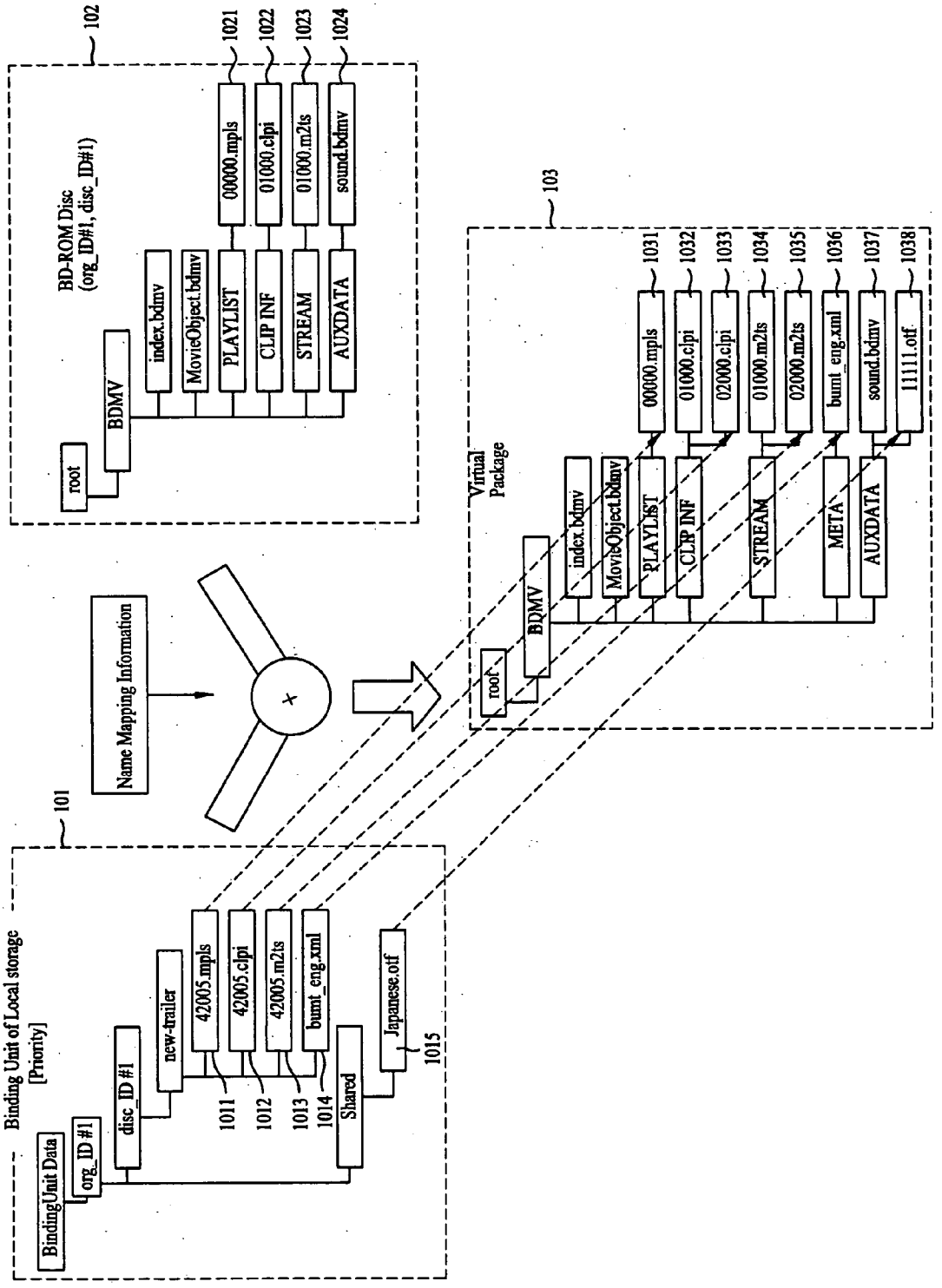
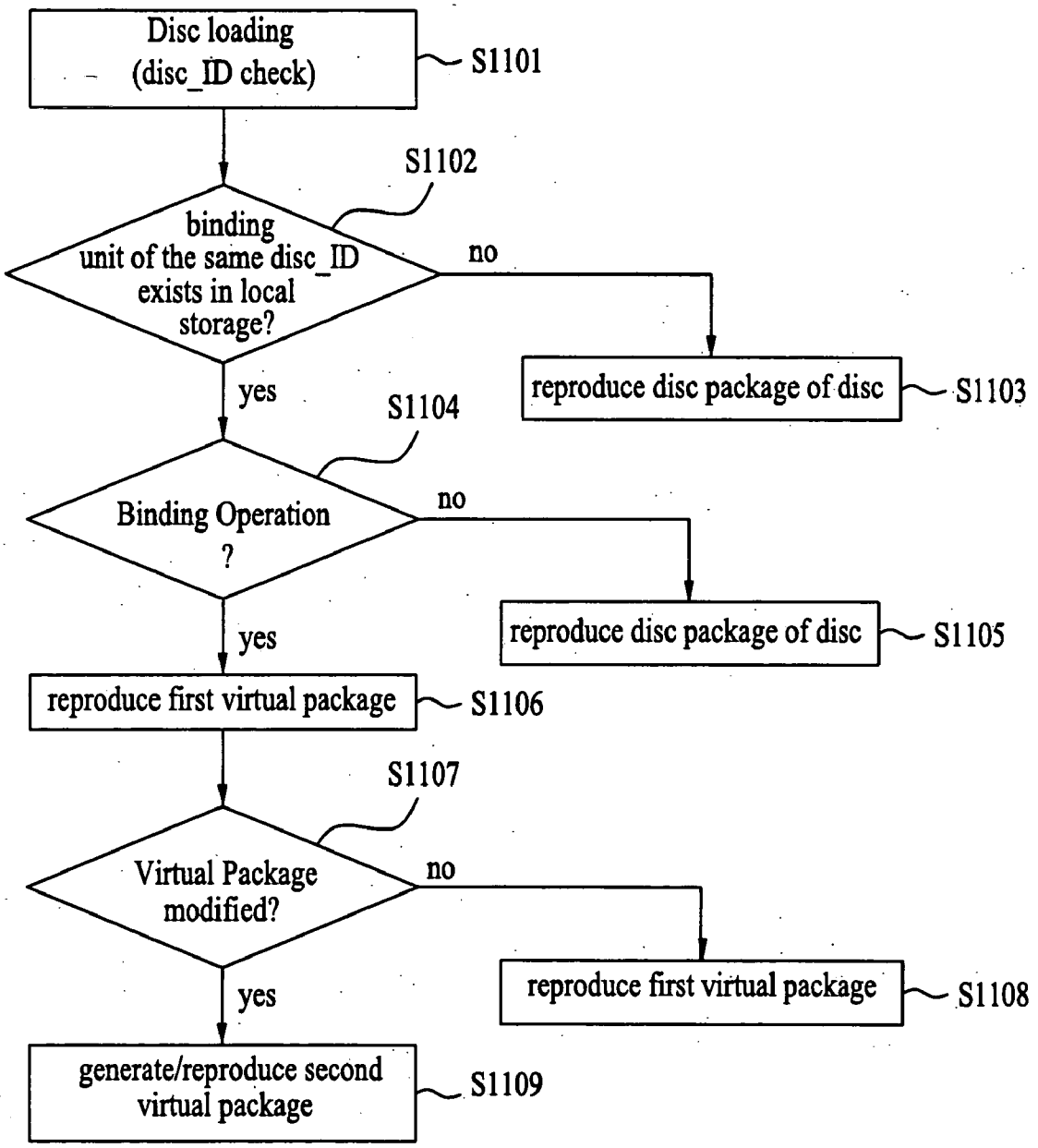

102
BD-ROM Disc
(org_ID#1, disc_ID#1)
root
BDMV
index.bdmv
MovieObject.bdmv
PLAYLIST
CLIP INF
STREAM
AUXDATA
00000.mpls
01000.clpi
01000.m2ts
sound.bdmv
1021
1022
1023
1024
Name Mapping Information
103
Virtual
Package
root
BDMV
index.bdmv
MovieObject.bdmv
PLAYLIST
CLIP INF
STREAM
META
AUXDATA
00000.mpls
01000.clpi
02000.clpi
01000.m2ts
02000.m2ts
bumt_eng.xml
sound.bdmv
11111.otf
1031
1032
1033
1034
1035
1036
1037
1038
101
Binding Unit of Local storage
[Priority]
BindingUnit Data
org_ID #1
disc_ID #1
new-trailer
42005.mpls
42005.clpi
42005.m2ts
bumt_eng.xml
Shared
Japanese.otf
1011
1012
1013
1014
1015

FIG. 11


Disc loading
(disc_ID check)
S1101
S1102
binding unit of the same disc_ID exists in local storage?
no
yes
reproduce disc package of disc
S1103
S1104
Binding Operation ?
no
yes
reproduce disc package of disc
S1105
reproduce first virtual package
S1106
S1107
Virtual Package modified?
no
yes
reproduce first virtual package
S1108
generate/reproduce second virtual package
S1109

METHOD AND APPARATUS FOR REPRODUCING DATA FROM RECORDING MEDIUM USING LOCAL STORAGE

[0001] This application claims the benefit of U.S. Provisional Application No. 60/641,780, filed on Jan. 7, 2005, in the name of inventors Kang Soo SEO, Byung Jin KIM, and Jea Yong YOO, entitled "METHOD AND APPARATUS FOR RECORDING MANAGEMENT INFORMATION ON A RECORDING MEDIUM AND THE RECORDING MEDIUM", which is hereby incorporated by reference as if fully set forth herein.

[0002] This application claims the benefit of Korean Patent Application No. 10-2005-0109677, filed on Nov. 16, 2005, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention

[0004] The present invention relates to a method and apparatus for reproducing data from a recording medium, and more particularly to a method and apparatus for reproducing data from a recording medium using a local storage contained in an optical recording/reproducing device.

[0005] 2. Discussion of the Related Art

[0006] Generally, there has been widely used an optical disc acting as a recording medium capable of recording a large amount of data therein. Particularly, there has recently been developed a high-density optical recording medium capable of recording/storing high-quality video data and high-quality audio data for a long period of time, for example, a Blu-ray Disc (BD).

[0007] The BD based on the next-generation recording medium technique has been considered to be the next-generation optical recording solution capable of storing much more data than a conventional DVD. In recent times, many developers have conducted intensive research into the international standard technical specification associated with the BD along with those of other digital devices.

[0008] In association with the above-mentioned situation, there has recently been developed an optical recording/reproducing device based on the BD international standard, but the BD international standard has not yet been completed, such that many limitations and problems occur in developing the optical recording/reproducing device.

[0009] Particularly, the above-mentioned optical recording/reproducing device must consider not only a basic function for recording/reproducing data of the BD, but also an additional function for enabling the optical recording/reproducing device to interact with peripheral digital devices. In other words, the optical recording/reproducing device must receive an external input signal, must display the received signal, and must reproduce desired data using the external input signal and the BD.

[0010] However, an apparatus for reproducing data from the recording medium to simultaneously reproduce the external input signal and data of the BD has not yet been established, such that many limitations and problems occur in developing a BD-based optical recording/reproducing device.

SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention is directed to a method and apparatus for reproducing data from a recording medium using a local storage that substantially obviate one or more problems due to limitations and disadvantages of the related art.

[0012] An object of the present invention is to provide a method and apparatus for downloading data from an external part, storing the downloaded data in a plurality of local storages, and effectively reproducing data recorded in the local storages and data recorded in a recording medium such as a BD.

[0013] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0014] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a method for reproducing data recorded on a recording medium using a local storage, the method comprises reading a disc package from the recording medium; reading a local storage package associated with the disc package from a local storage; displaying metadata information of the local storage package; generating a first binding unit from the local storage package according to binding information modified by a user with reference to the displayed metadata information; and generating a first virtual package by binding the first binding unit with the disc package according to the modified binding information.

[0015] In another aspect of the present invention, there is provided a method for generating a virtual package, the method comprises reading a first package from an optical disc; reading a second package associated with the first package from a local storage; displaying metadata information of the second package stored through a BD-J application; generating a binding unit from the second package, the binding unit including binding unit manifest information which is modified by a user with reference to the displayed metadata information; and generating a virtual package by binding the binding unit with the disc package according to the binding unit manifest information included in the binding unit.

[0016] In yet another aspect of the present invention, there is provided an apparatus for reproducing data recorded on a recording medium, the apparatus comprises a pickup unit for reading a disc package from the recording medium; a local storage for storing a local storage package associated with the disc package; and a controller for generating control signals to display metadata information of the local storage package, and to generates a binding unit from the local storage package according to binding information modified by a user with reference to the displayed metadata information, wherein the controller generates a virtual package by binding the binding unit with the disc package according to the modified binding information.

[0017] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0019] **FIG. 1** is a conceptual diagram illustrating a method and apparatus for reproducing data from a recording medium according to the present invention;

[0020] **FIG. 2** is a conceptual diagram illustrating a file structure recorded in an optical disc acting as a recording medium and a method for reproducing a specific title using the file structure;

[0021] **FIG. 3** is a structural diagram illustrating a data record structure of an optical disc acting as a recording medium according to the present invention;

[0022] **FIG. 4A** is a block diagram illustrating an optical recording/reproducing device according to the present invention;

[0023] **FIG. 4B** is a block diagram illustrating an apparatus for reproducing data using a local storage from among overall components contained in the optical recording/reproducing device according to the present invention;

[0024] **FIG. 5** is a conceptual diagram illustrating a method for generating a virtual package capable of simultaneously reproducing data recorded in a recording medium and data recorded in a local storage according to the present invention;

[0025] **FIG. 6** is a structural diagram illustrating a local storage binding unit for generating a virtual package in accordance with a preferred embodiment of the present invention;

[0026] **FIG. 7** is a structural diagram illustrating a local storage binding unit for generating a virtual package in accordance with another preferred embodiment of the present invention;

[0027] **FIG. 8** is an application image illustrating descriptor information for a binding unit according to the present invention;

[0028] **FIG. 9** is a flow chart illustrating a method for reproducing data from a recording medium using a local storage in accordance with a first preferred embodiment of the present invention;

[0029] **FIG. 10** is a conceptual diagram illustrating a method for generating the virtual package using a virtual file system (VFS), and modifying the virtual package according to the present invention; and

[0030] **FIG. 11** is a flow chart illustrating a method for reproducing data from a recording medium using a local storage in accordance with a first preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0031] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0032] A method and apparatus for reproducing data from a recording medium using a local storage will hereinafter be described with reference to the annexed drawings.

[0033] Prior to describing the present invention, it should be noted that most terms disclosed in the present invention correspond to general terms well known in the art, but some terms have been selected by the applicant as necessary and will hereinafter be disclosed in the following description of the present invention. Therefore, it is preferable that the terms defined by the applicant be understood on the basis of their meanings in the present invention.

[0034] A recording medium for use in the present invention is indicative of all recordable mediums, for example, an optical disc, and a magnetic tape, etc., according to various recording schemes. It should be noted that the term "Disc" is considered to be the same as the recording medium according to the present invention.

[0035] For the convenience of description and better understanding of the present invention, the optical disc, such as a BD, will hereinafter be exemplarily used as the above-mentioned recording medium in the present invention. It should be noted that technical ideas of the present invention can be applied to other recording mediums without departing from the scope and spirit of the invention.

[0036] The term "local storage" is indicative of a storage unit contained in an optical recording/reproducing device **10** shown in **FIG. 1**. In more detail, the term "local storage" is indicative of a component capable of receiving necessary information or data from a user, and storing the received information or data. For example, a general local storage may be indicative of a Hard Disc Drive (HDD), but it should be noted that the term "local storage" of the present invention is not limited to the HDD, and is applicable to other examples as necessary. It is obvious to those skilled in the art that the local storage may be connected/disconnected to/from the optical recording/reproducing device, and may be implemented with a portable recording medium (e.g., a portable HDD, and a portable flash memory, etc.)

[0037] Particularly, the term "local storage" is indicative of a storage unit for storing data associated with a recording medium such as a BD. The data associated with the recording medium is generally downloaded from an external device.

[0038] The term "Local Storage File Structure" for use in the present invention is indicative of a file structure of data stored in the local storage.

[0039] In association with the above-mentioned description, it is obvious to those skilled in the art that the local storage may directly read some permission data from the recording medium, may generate system data (e.g., metadata) associated with record/reproduction operations of the recording medium, and may download the system data from

an external Content Provider (CP), such that the system data may be stored in the local storage.

[0040] In this case, it is preferable that the metadata is indicative of data recorded in a metadata file, for example, Metadata for Binding Unit. Specifically, although a Descriptor for Binding Unit information indicative of information for modifying the binding unit or the virtual package will be described as the Metadata for Binding Unit in the present invention, it should be noted that the present invention is not limited to the aforementioned Descriptor for Binding Unit information.

[0041] The term "binding unit" is indicative of a set of files stored in the local storage. Particularly, the binding unit is indicative of a set of information (i.e., information set) associated with a specific recording medium. In this case, the information set is replaced with, is added (or appended) to, or is merged with data contained in the recording medium by information of the binding unit manifest files, such that it can simultaneously reproduce data of the recording medium and data of the local storage. Specifically, the binding unit can be deleted or modified even by the metadata file information, and a detailed description thereof will be described later.

[0042] For the convenience of description, data recorded in the recording medium is referred to as "original data", and data associated with the recording medium from among a plurality of data units stored in the local storage is referred to as "additional data".

[0043] In association with the above-mentioned description, a program for reproducing data of the recording medium or driving the optical recording/reproducing device is referred to as an "Application" in the present invention. For example, if the recording medium is determined to be a BD, a BDJ application is used as a drive application, and a Disc Library Application is used for a disc library. However, it should be noted that the present invention is not limited to the aforementioned specific application names, and is applicable to other examples.

[0044] **FIG. 1** is a conceptual diagram illustrating a method and apparatus for reproducing data according to the present invention. Unified usages of the optical recording/reproducing **10** and peripheral devices are shown in **FIG. 1**.

[0045] The optical recording/reproducing device **10** can record/reproduce data in/from various optical discs having different formats. If necessary, the optical recording/reproducing device **10** can record/reproduce specific data in/from only a specific optical disc such as a BD, or can reproduce the data from the optical disc without recording the data in the same. It should be noted that the present invention exemplarily uses a BD-player capable of reproducing data from the BD or a BD-recorder capable of recording data in the BD in consideration of correlation between the BD and peripheral devices for the convenience of description.

[0046] It is well known in the art that the optical recording/reproduction device **10** is also applicable to a drive embedded in a specific device such as a computer.

[0047] The optical recording/reproducing device **10** records or reproduces data in/from the optical disc **30**, receives an external input signal, performs a signal process on the received signal, and transmits the signal processed result to the external display **20**, such that a user can view the signal processed result on the display **20**. In this case, there is no limitation in a receivable external signal. For example, representative external input signals may be determined to be a DTV-associated signal and an Internet-associated signal, etc. Specifically, the Internet is indicative of a communication network to which a user easily gains access, such that the user can download specific Internet data using the optical recording/reproducing device **10**, and can use the downloaded data.

[0048] In association with the above-mentioned description, a person for providing content data used as an external source is generally referred to as a content provider (CP).

[0049] When original data is recorded in the optical disc **30** seated in the optical recording/reproducing device **10**, and additional data associated with the original data is present in other storage places (e.g., Internet), the present invention aims to reproduce the original data and the additional data at the same time.

[0050] Specifically, in order to reproduce user-desired data from among the additional data and the original data when the additional data and the original data are reproduced, a function capable of modifying the additional data according to a user command or operation is used, such that the present invention proposes a method for more effectively reproducing data.

[0051] For example, it is assumed that multiplexed AV (Audio/Video) streams are recorded as the original data recorded in the optical disc, and additional data for use in the Internet is an audio stream different from an audio stream (e.g., Korean) of the original data. In this case, some users may download a specific audio stream (e.g., English) acting as additional data from the Internet, may desire to reproduce the downloaded audio stream along with the AV stream acting as original data, or may desire to reproduce only the additional data. In order to implement the above-mentioned desires of the users, correlation between the original data and the additional data must be established, and there is needed a systemized method for managing/reproducing the above-mentioned data according to a user request.

[0052] For the convenience of description, although a signal recorded in the disc is referred to as the original data, and other signals existing in the outside of the disc are referred to as the additional data, it should be noted that the original data and the additional data classified according to their data acquisition methods are not limited to only specific data.

[0053] Generally, additional data may be indicative of audio data, presentation graphic (PG) data, interactive graphic (IG) data, or text subtitle, etc., but the additional data may also be indicative of a multiplexed AV stream including the above-mentioned data and video data. In other words, data associated with the original data simultaneously existing in the outside of the optical disc may act as additional data.

[0054] In order to satisfy the above-mentioned user requests, a predetermined file structure must be established between the original data and the additional data. Accordingly, a file structure and data record structure for use in the BD will hereinafter be described with reference to FIGS. **2~3**.

[0055] **FIG. 2** is a conceptual diagram illustrating a file structure for reproducing/managing the original data recorded in an optical disc, and a method for reproducing a specific title according to the file structure. Specifically, the present invention assumes that the disc is a BD-ROM.

[0056] Referring to **FIG. 2**, the file structure according to the present invention includes one or more BD directories (BDMV) under a single root directory. The BD directory (BDMV) includes not only an index file "index" acting as a general file (i.e., an upper file) capable of guaranteeing user interactivity, but also the above-mentioned object. The file structure includes a variety of directories for storing information of actual data recorded in a disc and other information associated with a method for reproducing the data, for example, a playlist directory (PLAYLIST), a clip information directory (CLIPINF), a stream directory (STREAM), an auxiliary data directory (AUXDATA), a metadata directory (META), and a backup directory (BACKUP). The above-mentioned directories and a variety of files included in the directory will hereinafter be described.

[0057] The auxiliary data directory (AUXDATA) includes an additional data file for reproducing data of the disc. For example, the AUXDATA directory includes a "Sound.bdmv" file for providing a user with sound data when an interactive graphic function is executed, and an "11111.otf" file for providing the user with font information when data of the disc is reproduced.

[0058] The stream directory (STREAM) includes a plurality of AV stream files recorded in a disc according to a specific format. Generally, individual streams are recorded using an MPEG-2 based transport packet, and the stream directory (STREAM) uses extension names of stream files (01000.m2ts and 02000.m2ts) as a specific extension name "*.m2ts". Particularly, if video/audio/graphic information from among the above-mentioned streams is multiplexed, the multiplexed information is called an AV stream, and a single title is composed of at least one AV stream file.

[0059] The clip information (Clip-info) directory (CLIPINF) is composed of a plurality of clip-info files (01000.clpi and 02000.clpi) connected to the above-mentioned stream files on a one-to-one basis. Particularly, the clip-info files (*.clpi) record attribute information and timing information of the stream files (*.m2ts) therein. The clip-info files (*.clpi) connected to the stream files (*.m2ts) on a one-to-one basis are generically named a "Clip". In other words, this means that a single clip is indicative of data composed of a stream file (*.m2ts) and a clip-info file (*.clpi).

[0060] The playlist directory (PLAYLIST) includes a plurality of playlist files (*.mpls). Each playlist file (*.mpls) includes one or more playitems (PlayItem) and one or more sub-playitems (SubPlayItem). Each playitem (PlayItem) and each sub-playitem (SubPlayItem) are adapted to designate a playing interval during which a specific clip is reproduced. The playitem (PlayItem) and the sub-playitem (SubPlayItem) include information associated with a specific clip to be reproduced, i.e., information associated with a reproduction start time (IN-Time) and other information associated with a reproduction termination time (OUT-Time) of the specific clip.

[0061] In association with the above-mentioned description, a process for reproducing data using at least one playitem (PlayItem) in the playlist file is referred to as a main path, and a process for reproducing data using individual sub-play items (SubPlayItem) is referred to as a sub-path. The playlist file must contain a single main path. The playlist file may contain at least one sub-path according to the presence or absence of the sub-playitem (SubPlayItem) as necessary.

[0062] In conclusion, the playlist file acts as a basic reproduction/management file unit contained in overall reproduction/management file structures for reproducing a desired clip by combination of one or more playitems (PlayItem).

[0063] The metadata directory (META) is indicative of a directory including metadata files. The metadata files include metadata information for the binding unit. It is preferable that the metadata information for the binding unit includes descriptor information capable of allowing a user to recognize contents of data stored in the local storage.

[0064] Preferably, the descriptor information may include "Descriptors for Disc Information" for modifying individual directories associated with a specific disc (e.g, disc_ID #1) and "Descriptors for Title Information" for modifying individual titles.

[0065] Specifically, a single metadata file is used for a Disc Specific Directory and a Shared Directory, respectively. For example, the metadata file associated with the present invention is recorded as a file name such as "bumt_000.xml".

[0066] In association with the above-mentioned description, head information "bumt_" contained in the aforementioned file name is used as a File Descriptor Code distinguished from other data. For example, a file beginning with the "bumt_" information is indicative of "Descriptor File for Binding Unit", the "Descriptor File for Binding Unit" of the present invention may be used as a descriptor file, and it should be noted that the "Descriptor File for Binding Unit" is considered to be the same as the descriptor file.

[0067] Specific information "_OOO_" contained in the aforementioned file name is used as a language code for identifying supported language information. For example, the Descriptor File for Binding Unit" composed of the English language may be denoted by "_eng_", the Descriptor File for Binding Unit" composed of the Korean language may be denoted by "_kor_", the Descriptor File for Binding Unit" composed of the Japanese language may be denoted by "_jpn_", and the Descriptor File for Binding Unit" composed of a plurality of languages may be denoted by "_mul_".

[0068] Specific information "_xml" contained in the file name is indicative of description language, and it should be noted that other limitations (e.g., a file size) may be applied to the metadata file structure as necessary.

[0069] For example, the "Descriptor File for Binding Unit" acting as a metadata file for modifying (deleting or modifying) the local storage binding unit may be denoted by "bumt_eng_xml".

[0070] The "Descriptor file for Binding Unit" is stored in the same directory as other metadata files. For example, the "Descriptor file for Binding Unit" is located under the metadata directory (META) of a specific directory (disc_ID

#1) of a specific disc, or is located under the metadata directory (META) of the shared directory (Shared).

[0071] The backup directory (BACKUP) stores a plurality of duplicate files, i.e., a duplicate file (also called "copied files") of the index file "index" storing information associated with disc reproduction, a duplicate file of the object file "MovieObject", duplicate files of all playlist files (*.mpls) contained in the playlist directory (PLAYLIST), and duplicate files of all clip-info files (*.clpi) contained in the clip-info directory (CLIPINF). If the above-mentioned files ("index", "MovieObject", "*.mpls", and "*.clpi") are damaged, a disc reproduction process is also fatally damaged, such that the backup directory (BACKUP) is designed to pre-store duplicate files of the above-mentioned files as backup files.

[0072] In association with the above-mentioned description, a method for reproducing a specific title using the above-mentioned disc file structure is shown in **FIG. 2**.

[0073] If a user enters a title reproduction command in association with a title used as an index file (also called "index table"), reproduction of the title begins. A detailed description thereof will hereinafter be described.

[0074] The index file (index.bdmv) includes first playback information "First Playback" indicative of information associated with a first reproduction image when data of a corresponding disc is loaded, top menu information "Top Menu" for providing a menu image, and at least one title information "Title #1~Title #n".

[0075] If the optical disc **30** is loaded in the optical recording/reproducing device **10**, title menu information associated with the index table is provided to the user via the display **20**. If the user selects a specific title or a specific menu contained in a menu image, data reproduction begins according to a scenario pre-defined by a disc manufacturer. In other words, if the user enters a command for reproducing a specific title (e.g., title #1), a specific playlist file is executed according to a command contained in the object file (MovieObject) of the reproduction/management file structure. Thereafter, one or more clips (e.g., Clip #1~Clip #3) constructing the title #1 are reproduced by a specific playitem and/or sub-playitem contained in the playlist file according to the playlist file information.

[0076] **FIG. 3** is a structural diagram illustrating a data record structure recorded in a recording medium according to the present invention. In more detail, **FIG. 3** shows a disc record format of information associated with the file structure.

[0077] As shown in **FIG. 3**, from the viewpoint of an inner area of the disc, the above-mentioned disc structure sequentially includes a file system information area serving as system information for managing overall files, a database area for recording a playlist file and a clip-info file to reproduce a recorded AV stream (*.m2ts), and an AV stream area for recording a plurality of streams composed of audio data, video data, and graphic data, etc. Particularly, it should be noted that data recorded in the AV stream area may be determined to be original data as previously stated above.

[0078] The present invention provides a method and apparatus for simultaneously reproducing original data (e.g., a file structure shown in **FIG. 2**) recorded in the disc and additional data recorded in the local storage, and a variety of preferred embodiments according to the present invention will hereinafter be described.

[0079] **FIG. 4A** is a block diagram illustrating the optical recording/reproducing device **10** according to the present invention.

[0080] Referring to **FIG. 4A**, the optical recording/reproducing device **10** includes a pickup unit **11**, a servo unit **14**, a signal processor **13**, a local storage **15**, and a microprocessor **16**. The pickup unit **11** reproduces original data recorded in the optical disc and management information including reproduction/management file information. The servo unit **14** controls operations of the pickup unit **11**. The signal processor **13** receives a reproduction signal from the pickup unit **11**, restores the received reproduction signal to a desired signal value, or modulates a signal to be recorded into another signal recorded in the optical disc, such that it transmits the restored or modulated result. The local storage stores data therein. The microprocessor **16** controls overall operations of the above-mentioned components.

[0081] Preferably, when the local storage **15** constructs a file structure for storing additional data downloaded from an external part, the additional data may include a metadata file including metadata information capable of deleting or modifying the binding unit or the virtual package.

[0082] The present invention is applicable to an example in which a plurality of local storages **15** are used or another example in which a plurality of binding units are contained in a single local storage **15**.

[0083] A controller **12** downloads additional data from outside of the optical disc upon receiving a command from a user, stores the downloaded additional data in the local storage **15**, and configures a binding unit using Binding Unit Manifest Information recorded in Binding unit manifest files of the local storage. In addition, the controller **12** configures a virtual file structure (hereinafter referred to as a virtual package) using the binding unit manifest information recorded in the binding unit manifest files, such that it can reproduce data contained in the recording medium and data contained in the local storage. The controller reproduces the original data and/or the additional data using the virtual package upon receiving a request from a user.

[0084] The virtual package generated by the controller **12** includes at least one virtual playlist including a playitem capable of reproducing a plurality of clips.

[0085] The controller **12** controls the modifying of the binding unit using "Descriptor Information for Binding Unit" from among metadata information, such that it generates an modified binding unit. The controller **12** performs a binding unit for binding or combining the modified binding unit with a disc package, such that it generates a method for generating the virtual package. The controller **12** can modify the virtual package using the binding unit manifest information.

[0086] Therefore, if a user performs the modification operation by referring to an application image using the "Descriptor Information for Binding Unit" from among the metadata information, the controller **12** can modify the binding unit or the virtual package according to a user command.

[0087] In association with the above-mentioned description, a detailed description of the Binding Unit Manifest Files, the Binding Unit Manifest Information, and the virtual package will hereinafter be described with reference to the annexed drawings.

[0088] The AV decoder **17** finally decodes output data (i.e., original data and/or additional data) upon receiving a control signal from the controller **12**, and provides the user with the decoded result.

[0089] The AV encoder **18** converts an input signal into a specific format signal (e.g., an MPEG2 transport stream) upon receiving a control signal from the controller **12**, and transmits the converted result to the signal processor **13**.

[0090] The new virtual package may be stored in the local storage **15** such that it can be re-used in future. Also, the new virtual package may be temporarily stored in an additional dynamic memory, and may then be used.

[0091] **FIG. 4B** is a block diagram illustrating an apparatus for reproducing data of an optical disc using a local storage from among overall components contained in the optical recording/reproducing device **10** according to the present invention.

[0092] Information stored in the local storage **15** will hereinafter be described. The local storage **15** according to the present invention stores file information (Directory-File for disc_ID #n dependent) including directories and files for every individual disc identification (ID) information, and a plurality of additional clips downloaded from an external part.

[0093] A binding unit of the local storage **15** is generated, and the local storage **15** may include binding unit manifest information for a binding operation associated with a disc package, and may also include "Descriptor Information for Binding Unit" information for allowing a user to view an application image so as to modify the binding unit or the virtual package.

[0094] Specifically, the local storage **15** may include a plurality of file information units (Directory-File for disc_ID #n dependent) to cope with different discs. Therefore, the local storage **15** additionally requires a file system for managing the above-mentioned file information units. Specifically, the file system is also referred to as a local storage file system **41**, and the local storage file system **41** is indicative of a system for managing all files stored in the local storage **15**.

[0095] Therefore, if an optical disc (e.g., disc_ID #1) of a specific disc ID (disc_ID) is loaded in the optical recording/reproducing device **10**, the controller **12** contained in the optical recording/reproducing device **10** recognizes ID information of the disc using the pickup unit **11** and the signal processor **13**. If the local storage **15** stores file information, the controller reads binding unit file information equal to the loaded disc ID information from among all file information units stored in the local storage **15**, generates a virtual package by binding (or combining) the read information and the disc package, and reproduces both the original data of the disc and the additional data of the local storage using the generated virtual package.

[0096] However, although a single local storage **15** and a local storage file system **41** are depicted in **FIG. 4B**, the present invention relates to an example of a plurality of local storages, and it is obvious to those skilled in the art that the number of local storages **15** may be determined to be a plural number and the number of local storage file systems **41** may also be determined to be a plural number.

[0097] A method for combining (or binding) the local storage data with a disc package to form the virtual package will hereinafter be described with reference to **FIG. 5**.

[0098] **FIG. 5** is a conceptual diagram illustrating a method for generating the above-mentioned virtual package to simultaneously reproduce data of a recording medium and data of a local storage according to the present invention.

[0099] If a specific disc is loaded in the optical recording/reproducing device **10** on the condition that the information and contents shown in **FIG. 4***b* are stored in the local storage **15**, the optical recording/reproducing device **10** reads the file system information **41** contained in the local storage **15**, and at the same time reads disc file system information **42** including the file structure recorded in the disc, resulting in the creation of the VFS. In more detail, the virtual file system (VFS) is indicative of a file system virtually generated to manage both the file system contained in the local storage **15** and the other file system of the loaded disc.

[0100] The optical recording/reproducing device generates a new virtual package to simultaneously reproduce original data recorded in the disc and additional data recorded in the local storage using the above-mentioned virtual file system (VFS). For this purpose, the optical recording/reproducing device **10** reads file information (Directory-File for disc_ID #1 dependent) associated with the disc (e.g., disc_ID #1) from the file system, generates a binding unit according the read binding unit manifest information, reads the generated binding unit, and performs a binding operation for replacing the read file information with a disc package of the loaded disc (disc_ID #1) or appending the read file information to the disc package.

[0101] Specifically, the present invention is characterized in that the binding unit is modified by a metadata file before the binding operation associated with the binding unit manifest information is performed, or the virtual package is modified after being generated by the binding operation.

[0102] In association with the above-mentioned description, the binding unit manifest file according to the present invention includes a list (i.e., Files and Titles relation List) indicative of a relationship between files and titles; Name Mapping information for performing mapping of all files contained in the binding unit to form the virtual package; Progressive Playlist information for progressive playlists; and Credential information.

[0103] Specifically, the above-mentioned name mapping information is used when file structure data of the local storage generates the binding unit or when the binding unit is combined with the disc package.

[0104] The virtual package generated by the above-mentioned binding operation is indicative of a file structure for reproducing/managing an original clip **422** and an additional clip **412**. The original clip **422** is composed of original data recorded in the disc. The additional clip **412** is composed of additional data recorded in the local storage.

[0105] A preferred embodiment for generating the local storage binding unit will hereinafter be described with reference to **FIG. 6**. The preferred embodiment shown in **FIG. 6** is characterized in that the binding unit generates a file structure including a directory in title units, and it should be noted that the present invention is applicable to other examples.

[0106] The aforementioned binding unit configured in title units may have the same file structure as that of the recording medium. If necessary, the binding unit may have a file structure different from that of the recording medium.

[0107] **FIG. 6** is a structural diagram illustrating a local storage binding unit for generating a virtual package according to the present invention. Specifically, **FIG. 6** shows a preferred embodiment in which the "org_ID #1" and the "disc_ID #1" are used.

[0108] Referring to **FIG. 6**, the binding unit manifest file (disc_ID #1.bumf) **61** contained in the local storage file structure includes mapping information for mapping lower files (42005.mpls, 42005.clpi, and 42005.m2ts) of a new trailer to an auxiliary data file (Japanese.otf) contained in the Shared directory of the disc.

[0109] If the disc binding unit (Binding Unit of disc_ID #1) **62** is generated by the aforementioned mapping information, a new-trailer directory is located under the specific disc directory (disc_ID #1). The aforementioned new-trailer directory includes a playlist file (42005.mpls), a clip-info file (42005.clpi), and a stream file (42005.m2ts). An auxiliary data file (Japanese.otf) is located under the Shared directory.

[0110] In association with the above-mentioned description, all files of the generated binding unit act as Read-only files, and the aforementioned binding unit combined with the disc package generates a new virtual package to reproduce data of the recording medium and/or data of the local storage.

[0111] **FIG. 7** is a structural diagram illustrating a local storage binding unit for generating a virtual package in accordance with another preferred embodiment of the present invention. Specifically, **FIG. 7** shows a preferred embodiment in which the local storage file structure including the "Descriptor File for Binding Unit" is modified and then the binding unit is generated according to the binding unit manifest file.

[0112] Referring to **FIG. 7**, the binding unit manifest file (disc_ID #1.bumf) **71** contained in the local storage file structure includes mapping information for mapping files (72005.mpls: **711**, 72005.clpi: **712**, and 72005.m2ts: **713**) of a specific title (e.g., Title #1) of a new trailer directory (New-trailer), files (62005.mpls: **714**, 62005.clpi: **715**, and 62005.m2ts: **716**) of another title (e.g., Title #2), a "Descriptor File for Binding Unit" (bumt_eng.xml) **717**, and an auxiliary data file (Chinese.otf) located under the shared directory (Shared).

[0113] In the case where a user views an application image for the binding unit descriptor by the "Descriptor File for Binding Unit" before the disc binding unit associated with the mapping information is generated, and deletes a specific title (Title #1), the binding unit manifest file (disc_ID #1.bumf) **71** is modified, such that the binding unit manifest file information is changed to a file including mapping information for mapping files (62005.mpls: **714**, 62005.clpi: **715**, and 62005.m2ts: **716**) of a specific title (e.g., Title #1) located under the new-trailer directory (New-trailer) to an auxiliary data file (Japanese.otf: **718**) located under the shared directory (Shared), resulting in the creation of a new modified binding unit manifest file.

[0114] Therefore, if the disc binding unit (Binding Unit of disc_ID #1) **72** is generated according to the mapping information of the new binding unit manifest file, the new-trailer directory (New-trailer) is located under the Disc Specific Directory (disc_ID #1). The new-trailer directory (New-trailer) includes a playlist file (62005.mpls) **724**, a clip-info file (62005.clpi) **725**, and a stream file (62005.m2ts) **726** for a specific title (Title #2). An auxiliary data file (Japanese.otf) **728** is located under the shared directory (Shared).

[0115] In association with the above-mentioned description, all files of the generated binding unit act as Read-only files, and the aforementioned binding unit combined with the disc package generates a new virtual package to reproduce data of the recording medium and/or data of the local storage, as previously shown in **FIG. 6**.

[0116] **FIG. 8** is an application image illustrating descriptor information for a binding unit according to the present invention. The modifying of the binding unit will be described with reference to **FIG. 8**.

[0117] For example, if the descriptor information for the binding unit (Descriptor for Binding Unit) is depicted by an application image displayable on a display, a directory name indicative of selected directory information **800** is a movie title "Die Hard", a specific title (Title #1) indicative of a content list is a specific image "Movie #1", a specific title (Title #2) is indicative of another specific image "Movie #2", a download site indicative of a CP's site includes information of an Internet Web-site "WWW.FOX.com" and download time information "Jan-10-2005" as download information. Besides, the download site may further include Directory Property information, Latest Downloaded Time information, or Updated Time information, etc. It should be noted that the present invention is not limited to the aforementioned examples, and is applicable to other examples.

[0118] If a user views a specific command "Do you want to delete data associated with this disc ?" to modify the binding unit or the virtual package in the application image showing the aforementioned selected directory information **800**, the user can delete data of a desired disc by a descriptor application acting as an modifying program.

[0119] However, if the user desires to modify information of a specific title (e.g., Title #1) without deleting specific disc information, and selects the specific title (Title #1), the application image shows the selected title information **810** on a display. In the case of the selected title information **810**, a title name is a specific movie "Die Hard", a title type is a movie title, and downloaded lists are Japanese Audio information and Korean Text Subtitle Information, etc. Besides, the selected title information **810** may include a downloaded site, etc., but it should be noted that the present invention is not limited to the aforementioned examples, and is applicable to other examples.

[0120] If a user views a specific command "Do you want to delete data associated with this title ?" to modify the

binding unit or the virtual package in the application image showing the aforementioned selected directory information **810**, the user can delete data of a desired title (e.g., Title #1) disc by a descriptor application acting as an modifying program.

[0121] **FIG. 9** is a flow chart illustrating a method for reproducing data from a recording medium using a local storage in accordance with a first preferred embodiment of the present invention. Specifically, **FIG. 9** shows an example in which the binding unit is modified by the descriptor information for the binding unit.

[0122] Referring to **FIG. 9**, if the disc is loaded in the optical recording/reproducing device, the optical recording/reproducing device recognizes disc ID (disc_ID) information in local storage data at step S**901**.

[0123] The optical recording/reproducing device reads file information including local storage file structure information of the same disc ID (disc_ID) as the loaded disc from the local storage at step S**902**.

[0124] The file information includes a metadata file for the binding unit. When content data is downloaded from an external CP, a metadata file is also downloaded from the external CP.

[0125] The metadata file is modified by the application. For example, if a user command enters the optical recording/reproducing device via a user interface because the user desires to delete or modify specific content data contained in a specific directory, specific content data to be modified by the user is deleted by a BD-J application, and a metadata file is updated by the deleted information.

[0126] It is determined whether the modifying operation caused by the metadata information from among file information of the same disc ID (disc_ID) is performed at step S**903**.

[0127] The metadata information is indicative of descriptor information for the binding unit (Descriptors for Binding Unit), and is required to recognize each binding unit as information when the user desires to modify the binding unit.

[0128] The user desires to recognize a variety of information, i.e., CP content information downloaded/stored in the local storage, content information of a disc, and content information of a title, such that descriptor information is required to recognize the aforementioned information. The user can perform the deleting operation from among directory-, disc-, and title-modifying operations using the aforementioned descriptor information. In other words, the descriptor information can support a user operation for the aforementioned modifying operation.

[0129] In association with the above-mentioned description, the modifying application from among a binding unit group composed of a single binding unit or a plurality of binding units uses "Descriptor for Disc Information" to modify individual directories associated with a specific disc in the Disc Library Application. Preferably, the modifying operation of individual files associated with a specific title may be performed by "Descriptor for Title Information".

[0130] If the modifying operation caused by the metadata information is not performed at step S**903**, a first binding unit indicative of a binding unit based on the Binding Unit Manifest Files is generated at step S**904**.

[0131] If the modifying operation caused by the metadata information is performed at step S**903**, the local storage file structure is modified according to the metadata file, and a second binding unit indicative of the binding unit associated with the modified binding unit manifest files is generated at step S**905**.

[0132] It is determined whether the binding operation for binding (or combining) the generated binding unit with the disc package at steps S**904**~S**905** is performed at step S**906**.

[0133] If the binding operation is not performed at step S**906**, a disc package is reproduced at step S**907**.

[0134] If the binding operation is performed at step S**906**, the binding operation associated with the name mapping information contained in the binding unit manifest files is performed so that the virtual package is generated. Original data of a disc acting as a recording medium and additional data of a local storage are reproduced according to the virtual package at step S**908**.

[0135] In association with the above-mentioned description, the binding priority can be established during the aforementioned binding operation. It is preferable that the controller **12** may establish the binding priority. When binding operation is performed between files in the local storage and files in the recording medium disc, the binding priority is as follows. The file of the Disc Specific Area Binding Unit has priority over the file of the Shared Area Binding Unit. Furthermore, the file of the Shared Area Binding Unit has priority over the file of the Disc Package.

[0136] In association with the above-mentioned description, the binding unit is basically similar to the disc package. If necessary, the binding unit configured in title units may have the same file structure as that of the recording medium, or may have a file structure different from that of the recording medium.

[0137] It should be noted that the binding unit cannot be operated as a reproduction/management file by itself, differently from the disc package.

[0138] If it is assumed that the binding unit is designed to perform data reproduction by itself, this data reproduction is similar to data reproduction of the local storage, such that the above-mentioned operations of the binding unit are contrary to the purpose of the present invention for simultaneously reproducing both original data recorded in the disc and additional data recorded in the local storage.

[0139] Therefore, the virtual file system (VFS) specifically uses name mapping information from among the above-mentioned binding unit manifest files, and performs a binding operation by binding (or combining) the binding unit updated to the local storage file structure with the disc package contained in the loaded disc, such that it generates a new virtual package.

[0140] Preferably, the generated virtual package may have the same structure as that of the disc package.

[0141] **FIG. 10** is a conceptual diagram illustrating a method for generating the virtual package using a virtual file system (VFS), and modifying the virtual package according to the present invention.

[0142] For example, the disc package (org_ID #1, disc_ID #1: **102**) contained in a specific disc includes an index file (index.bdmv), an object file (MovieObject.bdmv), a playlist file (00000.mpls) **1021**, a clip-info file (01000.clpi) **1022**, a stream file (01000.m2ts), and an auxiliary data file (sound.bdmv) **1024** in the BD directory (BDMV) indicative of a lower directory of the root directory.

[0143] The newly-downloaded-updated binding unit associated with the loaded disc (e.g., disc_ID #1) or the local storage binding unit **101**, which is pre-downloaded and stored in the local storage, includes a disc specific directory (disc_ID #1) and a disc Shared directory (Shared) under the specific CP directory (e.g., an org_ID #1).

[0144] The new-trailer directory indicative of a lower directory of the disc specific directory (disc_ID #1) includes a specific playlist file (42005.mpls) **1011**, a clip-info file (42005.clpi) **1012** managed by the playlist file (42005.mpls) **1011**, and a stream file (42005.m2ts) **1013**. The disc shared directory (Shared) includes an auxiliary data file (Japanese.otf) **1015**, such that the binding unit of the local storage is generated.

[0145] According to the preferred embodiment of the present invention, the name mapping information of the binding unit manifest files of the local storage according to the present invention includes specific information indicative of names and locations of the binding unit files in the virtual package. For example, according to the name mapping information of the binding unit manifest files, the playlist file (42005.mpls) **1011** contained in the binding unit is replaced with the playlist file (00000.mpls) **1031** contained in the playlist directory (PLAYLIST) of the virtual package, the clip-info file (42005.clpi) **1012** is replaced with the clip-info file (02000.clpi) **1033** of the clip-info directory (CLIPINF) of the virtual package, the stream file (42005.m2ts) **1013** is replaced with the stream file (02000.m2ts) **1035** of the stream directory (STREAM) of the virtual package, the "Descriptor File for Binding Unit" (bumt_eng.xml) **1014** is replaced with the "Descriptor File for Binding Unit" (bumt_eng.xml) **1036** of the metadata directory (META) of the virtual package, and the auxiliary data file (Japanese.otf) **1015** is replaced with the auxiliary data file (11111.otf) **1038** of the AUXDATA directory of the virtual package. The aforementioned name mapping information includes list information of files associated with file locations.

[0146] Therefore, when the virtual file system (VFS) performs the binding operation, the binding operation is executed according to the aforementioned name mapping information recorded in the Binding Unit Manifest Files contained in the local storage, such that the virtual package is generated.

[0147] Therefore, the virtual package **103** generated by the name mapping information includes a BD directory acting as a lower directory of a root directory. The BD directory includes an index file (index.bdmv) and an object file (MovieObject.bdmv) according to the virtual package. The BD directory includes a playlist directory (PLAYLIST), a clip-info directory (CLIPIF), a stream directory (STREAM), a metadata directory (META), and an AUXDATA directory (AUXDATA). The playlist directory (PLAYLIST) includes a playlist file (00000.mpls) **1031** acting as a substitute for the playlist file (42005.mpls) **1011** of the local storage binding unit **101**. The clip-info directory (CLIPINF) appends a clip-info file (02000.clpi) **1033** acting as a substitute for the clip-info file (42005.clpi) **1012** of the local storage binding unit **101** to the clip-info file (01000.clpi) **1022** of the disc package. The stream directory (STREAM) appends a stream file (02000.m2ts) **1035** acting as a substitute for the stream file (42005.m2ts) **1013** of the local storage binding unit **101** to the stream file (01000.m2ts) **1023** of the disc package. The metadata directory (META) includes a "Descriptor File for Binding Unit" (bumt_eng.xml) **1036** acting as a metadata file of the local storage binding unit **101**. The AUXDATA directory (AUXDATA) appends an auxiliary data file (11111.otf) **1038** acting as a substitute for the auxiliary data file (Japanese.otf) **1015** of the local storage binding unit **101** to the auxiliary data file (sound.bdmv) **1024** of the disc package.

[0148] In association with the above-mentioned description, the index file (Index.bdmv) and the object file (MovieObject.bdmv), which act as upper files of the virtual package, may be updated in conventional index and object files (Index.bdmv and MovieObject.bdmv) contained in the disc on the basis of the newly-generated virtual playlist file (00000.mpls) **1031**.

[0149] For example, if a title is changed to another title by the playlist file (00000.mpls) **1031** contained in the virtual package (e.g., if a new title is added, a conventional title is deleted, or a title reproduction scenario is changed to another scenario), the aforementioned index and object files may be updated on the basis of the newly-generated virtual package.

[0150] In association with the above-mentioned description, the generated virtual package **103** is referred to as a first virtual package. If a user modifies the first virtual package according to the "Descriptor File for Binding Unit" (bumt_eng.xml) **1036** contained in the first virtual package, and generates a new virtual package, the new virtual package is referred to as a second virtual package.

[0151] For example, if the user deletes data of a specific title according to the "Descriptor File for Binding Unit" (bumt_eng.xml) **1036** from the first virtual package, the index and object files (index.bdmv and MovieObject.bdmv) acting as upper files contained in the second virtual package generated by the aforementioned deletion result are updated on the basis of the newly-generated virtual playlist file (00000.mpls), files of a specific title are deleted, such that the second virtual package is generated.

[0152] A method for reproducing original data indicative of the recording medium data and additional data indicative of the local storage data according to the aforementioned first and second virtual packages (i.e., the first virtual package and the second virtual package) will hereinafter be described with reference to **FIG. 11**.

[0153] **FIG. 11** is a flow chart illustrating a method for reproducing data from a recording medium using a local storage in accordance with a first preferred embodiment of the present invention. Specifically, **FIG. 11** is a flow chart illustrating a method for reproducing data of a recording medium and data of a local storage in a new virtual package generated by modifying a virtual package including the "Descriptor File for Binding Unit".

[0154] Referring to **FIG. 11**, if a disc is loaded in an optical recording/reproducing device, the optical recording/

reproducing device recognizes disc ID information (disc_ID) from the local storage data at step S1101.

[0155] The optical recording/reproducing device determines whether the binding unit of the same disc ID (disc_ID) exists in the aforementioned local storage at step S1102. In this case, if there are a plurality of local storages, a single binding unit of the same disc ID (disc_ID) may be contained in the local storages, or no binding unit of the same disc ID (disc_ID) exists in the local storages.

[0156] The binding unit includes the "Descriptor File for Binding Unit" (e.g., bumt_eng.xml) acting as a metadata file.

[0157] If it is determined that there is no binding unit of the same disc ID (disc_ID) in the local storage at step S1102, the optical recording/reproducing device reproduces data of a disc package contained in a disc acting as the recording medium at step S1103.

[0158] If it is determined the binding unit of the same disc ID (disc_ID) exists in the local storages, the optical recording/reproducing device determines whether the same file exists in the binding units having the same disc ID (disc_ID) at step S804.

[0159] If it is determined that the binding unit of the same disc ID (disc_ID) exists in the local storage at step S1102, it is determined whether a binding operation for binding (or combining) the binding unit with the disc package is performed at step S1104.

[0160] If it is determined that the binding operation is not performed at step S1104, the optical recording/reproducing device reproduces data of the disc package contained in a disc acting as the recording medium at step S1105.

[0161] If the binding operation is performed at step S1104, the optical recording/reproducing device generates the virtual package according to the name mapping information of the binding unit manifest files. The first virtual package includes the "Descriptor File for Binding Unit" (e.g., bumt_eng.xml) acting as a metadata file for the binding unit in the metadata directory (META) at step S1106.

[0162] Preferably, the binding operation may be performed on the condition that the optical recording/reproducing device is not connected to a network such as the Internet.

[0163] In association with the above-mentioned description, the binding priority may be established between a plurality of local storages. Preferably, the controller may establish the binding priority. In association with the binding priority contained in the local storage, the file of the Disc Specific Area Binding Unit has a binding priority higher than that that of the Shared Area Binding Unit.

[0164] Preferably, the binding priority between the file of the local storage binding unit and the file of the recording medium binding unit (i.e., the disc package) may be determined in the order of the local storage binding unit file→the disc package file. In other words, the local storage binding unit file has a binding priority higher than that of the disc package file.

[0165] It is determined whether the first virtual package generated at the above step S1106 is modified by a user command using the "Descriptor File for Binding Unit" (e.g., bumt_eng.xml) at step S1107.

[0166] If it is determined that the virtual package is not modified at step S1107, the optical recording/reproducing device reproduces recording medium data and local storage data according to the first virtual package generated at the above step S1106 at step S1108.

[0167] If it is determined that the virtual package is modified at step S1107, the optical recording/reproducing device generates the second virtual package by executing the user command. If there is a reproduction command, the optical recording/reproducing device reproduces recording medium data and local storage data according to the second virtual package at step S1109.

[0168] As apparent from the above description, a method and apparatus for reproducing data from a recording medium using a local storage according to the present invention can effectively reproduce original data recorded in a recording medium and additional data downloaded/recorded in a plurality of local storages. Also, the user can modify the additional data if required according to the present invention, such that the user can more conveniently use a variety of functions according to the present invention.

[0169] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

1. A method for reproducing data recorded on a recording medium using a local storage, the method comprising:

reading a disc package from the recording medium;

reading a local storage package associated with the disc package from a local storage;

displaying metadata information of the local storage package;

generating a first binding unit from the local storage package according to binding information modified by a user with reference to the displayed metadata information; and

generating a first virtual package by binding the first binding unit with the disc package according to the modified binding information.

2. The method according to claim 1, further comprising:

generating a second binding unit from the local storage package according to original binding information included in the local storage package; and

generating a second virtual package by binding the second binding unit with the disc package according to the original binding information.

3. The method according to claim 1, further comprising reproducing the disc package only.

4. The method according to claim 1, wherein the metadata information includes descriptor information indicating contents of data stored in the local storage.

5. The method according to claim 1, wherein the metadata information is included in a metadata file, and wherein the metadata file is included in a metadata directory which is included in the local storage package.

6. The method according to claim 5, wherein a file name of the metadata file indicates that the metadata file includes descriptor information and indicates language information of the metadata file.

7. The method according to claim 4, wherein the descriptor information indicates at least one of first contents provided by a content provider, second contents of the recording medium, and third contents of titles.

8. The method according to claim 1, wherein the user modifies the binding information through a BD-J application.

9. The method according to claim 1, wherein the user modifies the binding information using descriptors for disc information.

10. The method according to claim 9, wherein the binding information is automatically modified when the user deletes data associated with a specific disc from the local storage.

11. The method according to claim 1, wherein the user modified the binding information using descriptors for title information.

12. The method according to claim 11, wherein the binding information is automatically modified when the user deletes data associated with a specific title from the local storage.

13. The method according to claim 1, wherein the binding information comprises binding unit manifest information.

14. The method according to claim 13, wherein the binding unit manifest information is included in a binding unit manifest file, and wherein the binding unit manifest information comprises name mapping information associated with files contained in the binding unit.

15. The method according to claim 1, wherein the local storage package stored in the local storage includes a directory containing entire data associated with a particular disc.

16. The method according to claim 1, wherein the disc package includes a first object file and a first index file and the local storage package includes a second object file and a second index file, and wherein the virtual package includes the second object file and the second index file.

17. The method according to claim 1, wherein a virtual file system is used for generating the virtual package.

18. The method according to claim 1, wherein a file structure of the virtual package is identical to a file structure of the disc package.

19. A method for generating a virtual package, the method comprising:

reading a first package from an optical disc;

reading a second package associated with the first package from a local storage;

displaying metadata information of the second package stored through a BD-J application;

generating a binding unit from the second package, the binding unit including binding unit manifest information which is modified by a user with reference to the displayed metadata information; and

generating a virtual package by binding the binding unit with the disc package according to the binding unit manifest information included in the binding unit.

20. An apparatus for reproducing data recorded on a recording medium, the apparatus comprising:

a pickup unit for reading a disc package from the recording medium;

a local storage for storing a local storage package associated with the disc package; and

a controller for generating control signals to display metadata information of the local storage package, and to generates a binding unit from the local storage package according to binding information modified by a user with reference to the displayed metadata information, wherein the controller generates a virtual package by binding the binding unit with the disc package according to the modified binding information.

21. The apparatus of claim 20, wherein the metadata information includes descriptor information indicating contents of data stored in the local storage.

22. The apparatus of claim 20, wherein the metadata information includes descriptor information indicating at least one of first contents provided by a content provider, second contents of the recording medium, and third contents of titles.

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