US011017815B2

(12) **United States Patent**
Yoshida et al.

(10) **Patent No.: US 11,017,815 B2**
(45) **Date of Patent: May 25, 2021**

(54) **EDITING METHOD AND RECORDING AND REPRODUCING DEVICE**

(71) Applicant: **Maxell, Ltd.**, Kyoto (JP)

(72) Inventors: **Susumu Yoshida**, Kawasaki (JP); **Junji Shiokawa**, Chigasaki (JP); **Hiroo Okamoto**, Yokohama (JP)

(73) Assignee: **Maxell, Ltd.**, Kyoto (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/883,124**

(22) Filed: **May 26, 2020**

(65) **Prior Publication Data**

US 2020/0286524 A1 Sep. 10, 2020

Related U.S. Application Data

(63) Continuation of application No. 16/221,908, filed on Dec. 17, 2018, now Pat. No. 10,679,674, which is a (Continued)

(30) **Foreign Application Priority Data**

Dec. 2, 2004 (JP) 2004-349264
Dec. 28, 2004 (JP) 2004-378767
Dec. 28, 2004 (JP) 2004-378768

(51) **Int. Cl.**
H04N 9/80 (2006.01)
G11B 27/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G11B 27/102*** (2013.01); ***G06F 3/0482*** (2013.01); ***G11B 27/031*** (2013.01);
(Continued)

(58) **Field of Classification Search**
USPC 386/239, 240, 278, 280, 281, 282, 326, 386/353
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,086,619 A 4/1978 Miyake et al.
4,970,663 A 11/1990 Bedell et al.
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2 321 522 A1 9/1999
CN 1243596 A 2/2000
(Continued)

OTHER PUBLICATIONS

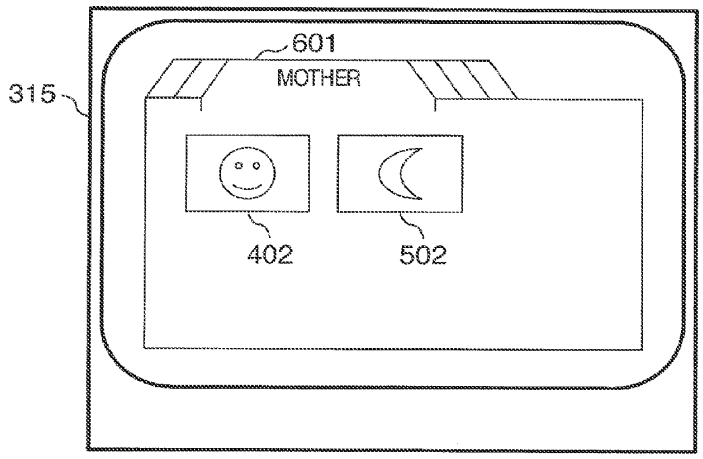
Fandango Media, LLC's S.P.R. 25 Invalidity Contentions which were filed Mar. 26, 2018 in the following litigation: *Maxell, Ltd.* v. *Fandango Media, LLC*, Civil Action No. 2:17-cv-07534 Ag-(SSx) (C.D. Cali.), filed Oct. 13, 2017.
(Continued)

Primary Examiner — Daquan Zhao
(74) *Attorney, Agent, or Firm* — Mattingly & Malur, PC

(57) **ABSTRACT**

In order to provide a recording and reproducing device that allows a user to select and manage arbitrary play lists, a unit of management for managing all registered play list information and an upper management hierarchical level are added. The unit of management is adapted to be handled on the same level with unified information that indicates a reproduction range of all AV data. User-defined unified information is adapted to be handled on the added management hierarchical level. The user-defined unified information is formed to allow arbitrary reproduction ranges contained on a lower hierarchical level to be registered.

27 Claims, 9 Drawing Sheets



Related U.S. Application Data

continuation of application No. 15/808,175, filed on Nov. 9, 2017, now Pat. No. 10,199,072, which is a continuation of application No. 15/176,435, filed on Jun. 8, 2016, now Pat. No. 9,818,449, which is a continuation of application No. 14/141,417, filed on Dec. 26, 2013, now Pat. No. 9,384,783, which is a continuation of application No. 12/567,898, filed on Sep. 28, 2009, now Pat. No. 8,644,684, which is a continuation of application No. 11/203,457, filed on Aug. 11, 2005, now Pat. No. 7,613,383.

(51) **Int. Cl.**

G11B 27/10	(2006.01)
G11B 27/034	(2006.01)
G11B 27/34	(2006.01)
H04N 5/76	(2006.01)
H04N 9/87	(2006.01)
G06F 3/0482	(2013.01)
G11B 27/031	(2006.01)
H04N 5/93	(2006.01)
H04N 5/92	(2006.01)
H04N 9/82	(2006.01)

(52) **U.S. Cl.**

CPC ***G11B 27/034*** (2013.01); ***G11B 27/34*** (2013.01); ***H04N 5/76*** (2013.01); ***H04N 9/87*** (2013.01); *G11B 2220/2562* (2013.01); *H04N 9/8205* (2013.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,442,744	A	8/1995	Piech et al.
5,616,876	A	4/1997	Cluts
5,654,746	A	8/1997	McMullan, Jr. et al.
5,704,051	A	12/1997	Lane et al.
5,715,403	A	2/1998	Stefik
5,734,823	A	3/1998	Saigh et al.
5,751,282	A	5/1998	Girard et al.
5,758,068	A	5/1998	Brandt et al.
5,870,754	A	2/1999	Dimitrova et al.
5,884,056	A	3/1999	Steele
5,930,446	A	7/1999	Kanda
5,974,219	A	10/1999	Fujita et al.
6,005,579	A	12/1999	Sugiyama et al.
6,020,930	A	2/2000	Legrand
6,023,520	A	2/2000	Nagasaka et al.
6,157,744	A	12/2000	Nagasaka et al.
6,166,735	A	12/2000	Dom et al.
6,175,362	B1	1/2001	Harms et al.
6,181,870	B1	1/2001	Okada et al.
6,182,069	B1	1/2001	Niblack et al.
6,219,837	B1	4/2001	Yeo et al.
6,236,971	B1	5/2001	Stefik et al.
6,243,725	B1	6/2001	Hempleman et al.
6,289,165	B1	9/2001	Abecassis
6,301,586	B1	10/2001	Yang et al.
6,400,378	B1	6/2002	Snook
6,408,301	B1	6/2002	Patton et al.
6,452,609	B1	9/2002	Katinsky et al.
6,456,334	B1	9/2002	Duhault
6,470,140	B1	10/2002	Sugimoto et al.
6,480,669	B1	11/2002	Tsugumagari et al.
6,611,813	B1	8/2003	Bratton
6,646,655	B1	11/2003	Brandt et al.
6,724,403	B1	4/2004	Santoro et al.
6,734,909	B1	5/2004	Terane et al.
6,754,548	B1	6/2004	Yoshii et al.
6,882,793	B1	4/2005	Fu et al.
6,934,964	B1	8/2005	Schaffer et al.
7,231,360	B2	6/2007	Sy
7,249,106	B1	7/2007	Tanabe et al.
7,257,774	B2	8/2007	Denoue et al.
7,281,220	B1	10/2007	Rashkovskiy
7,443,418	B2	10/2008	Bryant et al.
7,512,622	B2	3/2009	Volk et al.
7,565,675	B2	7/2009	Sincaglia et al.
7,594,177	B2	9/2009	Jojic et al.
7,610,306	B2	10/2009	Lin et al.
7,613,383	B2	11/2009	Yoshida et al.
7,639,943	B1	12/2009	Kalajan
7,640,514	B2	12/2009	Camara et al.
7,715,690	B1	5/2010	Nomura et al.
7,853,893	B2	12/2010	Muller et al.
7,974,511	B2	7/2011	Mikawa
8,036,516	B2	10/2011	Matsumoto
8,238,713	B2	8/2012	Barde et al.
8,291,444	B1	10/2012	Newell et al.
8,549,553	B2	10/2013	Barton et al.
2001/0009007	A1	7/2001	Miyamae et al.
2001/0023436	A1	9/2001	Srinivasan et al.
2001/0037379	A1	11/2001	Livnat
2001/0041049	A1	11/2001	Kanda
2001/0052127	A1	12/2001	Seo et al.
2001/0056434	A1	12/2001	Kaplan et al.
2002/0049979	A1	4/2002	White et al.
2002/0056098	A1	5/2002	White
2002/0069418	A1	6/2002	Phillips
2002/0166122	A1	11/2002	Kikinis et al.
2002/0180803	A1	12/2002	Kaplan et al.
2003/0005442	A1	1/2003	Brodersen et al.
2003/0063897	A1	4/2003	Jung-Kwon
2003/0088646	A1	5/2003	Yeo
2003/0090504	A1	5/2003	Brook et al.
2003/0093790	A1	5/2003	Logan et al.
2003/0122861	A1	7/2003	Jun et al.
2003/0149988	A1	8/2003	Ellis
2004/0001106	A1	1/2004	Deutscher et al.
2004/0021669	A1	2/2004	Fredlund et al.
2004/0068606	A1	4/2004	Kim et al.
2004/0078383	A1	4/2004	Mercer et al.
2005/0094031	A1	5/2005	Tecot et al.
2005/0193416	A1	9/2005	Przybylek
2006/0048057	A1	3/2006	Herberger et al.
2006/0064716	A1	3/2006	Sull et al.
2006/0093309	A1	5/2006	Herberger et al.
2006/0107289	A1	5/2006	DeYonker et al.
2006/0168147	A1	7/2006	Inour et al.
2006/0212455	A1	9/2006	Perry et al.
2007/0022382	A1*	1/2007	Honkaniemi G06F 16/954 715/733
2007/0220580	A1	9/2007	Putterman et al.
2008/0092168	A1	4/2008	Logan et al.
2009/0129740	A1	5/2009	O'rien et al.

FOREIGN PATENT DOCUMENTS

EP	1 058 257	A1	12/2000
JP	11-32301	A	2/1999
JP	2000-152180	A	5/2000
JP	2002-150503	A	5/2002
JP	2002-197806	A	7/2002
JP	2003-36652	A	2/2003
JP	2003-100055	A	4/2003
JP	2003-123389	A	4/2003
JP	2004-192779	A	7/2004
WO	97/25798	A1	7/1997
WO	99/48296	A1	9/1999

OTHER PUBLICATIONS

Ponceleon, D. et al., "Key to Effective Video Retrieval: Effective Cataloging and Browsing", 1998, pp. 99-107.

Srinivasan, S. et al., "What is in that Video Anyway?", 1999, pp. 388-393.

Pollack, W., "Tuning In: The Future of Copyright Protection for Online Music in the Digital Millennium", Fordham Law Review, 2000, pp. 2445-2488, vol. 68, Issue 6.

(56) **References Cited**

OTHER PUBLICATIONS

LG Electronics U.S.A., Inc. et al., "Zenith Installation and Operating Guide | Warranty" for DVR413 DVD Recorder, May 13, 2004.
Wactlar, H. A et al., "Lessons Learned from Building a Terabyte Digital Video Library", IEEE, 1999, pp. 66-73.
Japan Patent Office (JPO) office action for JPO patent application JP2008-268104 (dated Jun. 12, 2009).
Japan Patent Office (JPO) office action for JPO patent application JP2004-349264 (dated Aug. 6, 2008).
Chinese Intellectual Property Office (SIPO) office action for SIPO patent application CN2005-100935522 (dated May 26, 2008).
Toshiba HDD & DVD Video Recorder Instruction Manual RD-X5 Operating Instructions, Toshiba Corporation, pp. 148-159 (2004).
Office action for Japan Patent Office patent application JP2008-31843 (dated Dec. 21, 2010).
Central District of California Case No. 2:17-cv-7534.
Central District of California Case No. 2:17-cv-7538.
Fandango Media, LLC v. *Maxell, Ltd*., Petition for Inter Partes Review of U.S. Pat. No. 9,384,783, Inter Partes Review No. IPR2018-01432 Final Written Decision entered Feb. 10, 2020.

* cited by examiner

FIG.1

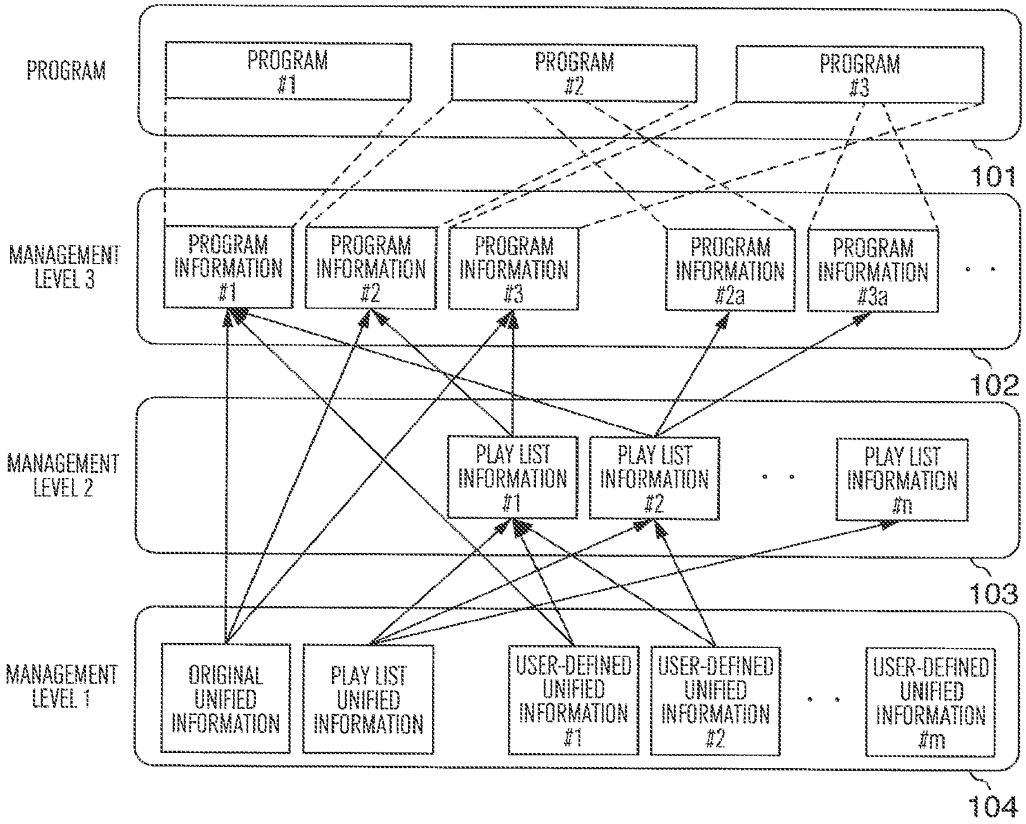

PROGRAM
PROGRAM #1
PROGRAM #2
PROGRAM #3
101
MANAGEMENT LEVEL 3
PROGRAM INFORMATION #1
PROGRAM INFORMATION #2
PROGRAM INFORMATION #3
PROGRAM INFORMATION #2a
PROGRAM INFORMATION #3a
102
MANAGEMENT LEVEL 2
PLAY LIST INFORMATION #1
PLAY LIST INFORMATION #2
PLAY LIST INFORMATION #n
103
MANAGEMENT LEVEL 1
ORIGINAL UNIFIED INFORMATION
PLAY LIST UNIFIED INFORMATION
USER-DEFINED UNIFIED INFORMATION #1
USER-DEFINED UNIFIED INFORMATION #2
USER-DEFINED UNIFIED INFORMATION #m
104

FIG.2
PRIOR ART

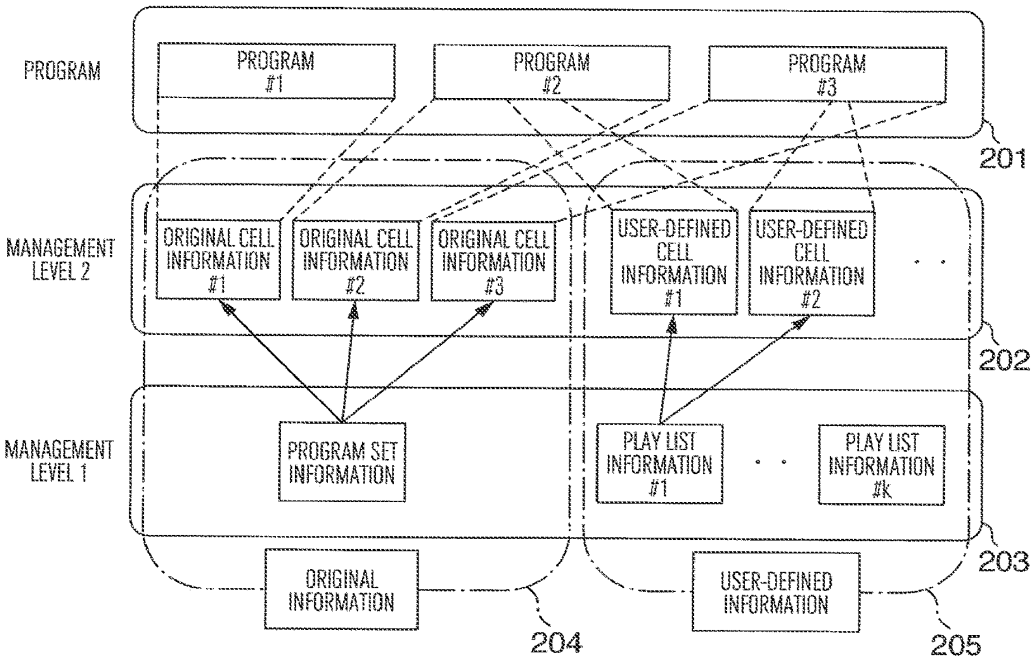


FIG.3

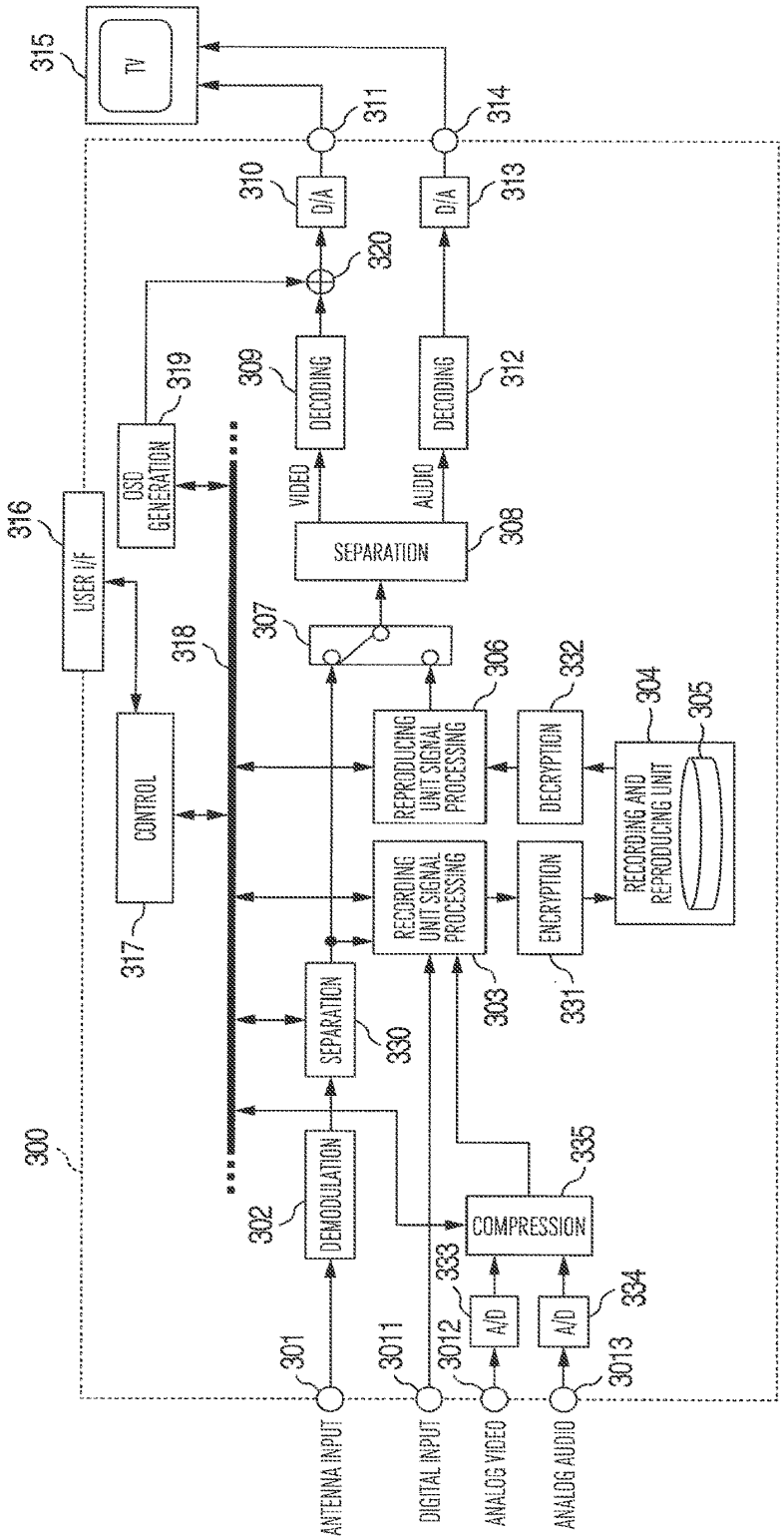

300
301
ANTENNA INPUT
3011
DIGITAL INPUT
3012
ANALOG VIDEO
3013
ANALOG AUDIO
302
DEMODULATION
330
SEPARATION
333
A/D
334
A/D
335
COMPRESSION
303
RECORDING UNIT SIGNAL PROCESSING
331
ENCRYPTION
304
305
RECORDING AND REPRODUCING UNIT
306
REPRODUCING UNIT SIGNAL PROCESSING
332
DECRYPTION
307
308
SEPARATION
VIDEO
AUDIO
309
DECODING
312
DECODING
310
D/A
313
D/A
311
314
315
TV
320
319
OSD GENERATION
316
USER I/F
317
CONTROL
318

FIG.4

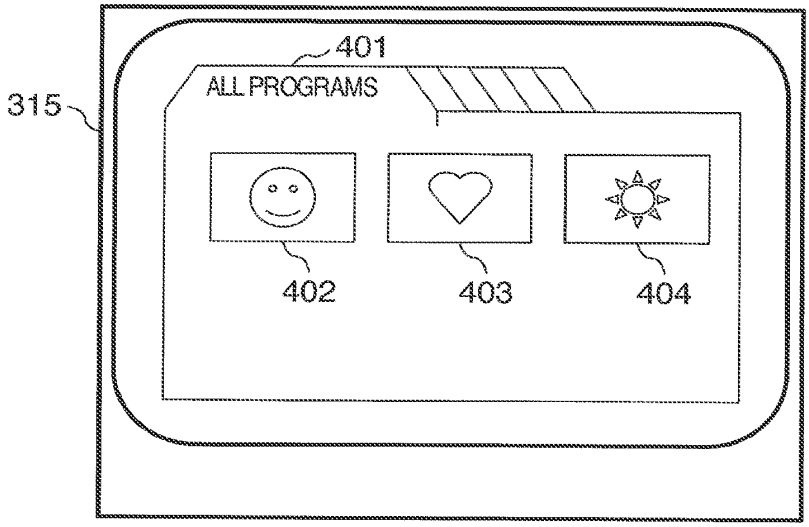

401
ALL PROGRAMS
315
402
403
404

FIG.5

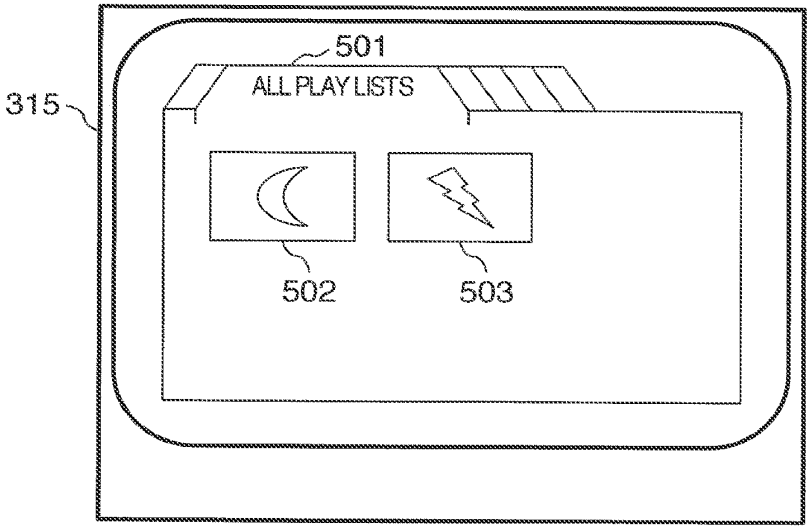

501
ALL PLAY LISTS
315
502
503

FIG.6

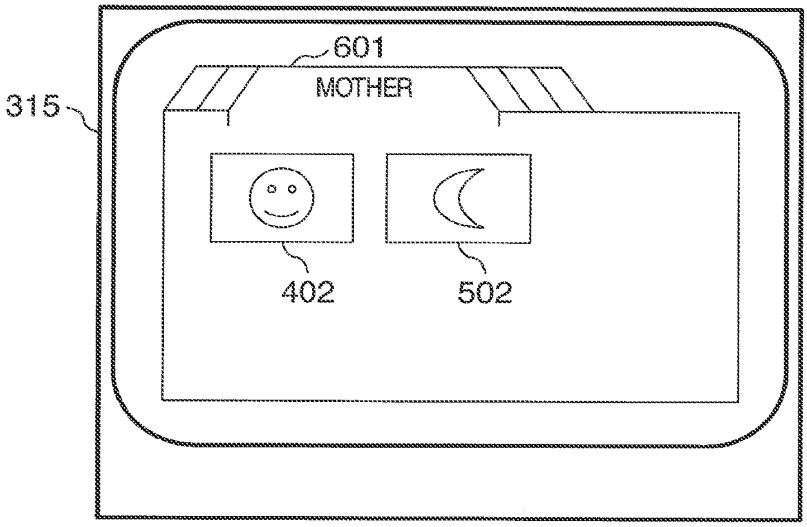


FIG.7

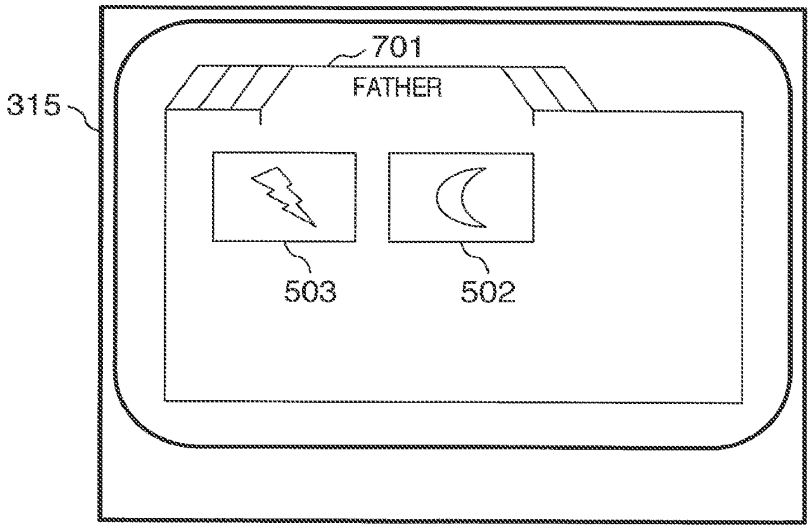


FIG.8

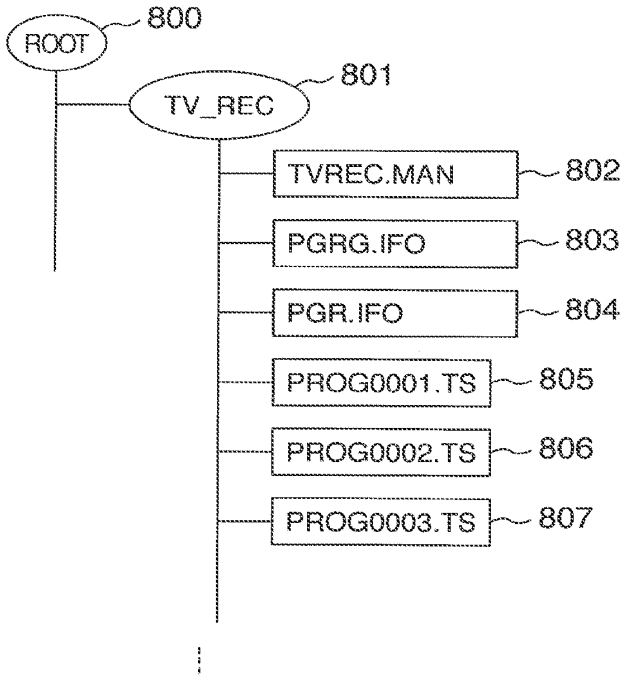

ROOT
800
TV_REC
801
TVREC.MAN
802
PGRG.IFO
803
PGR.IFO
804
PROG0001.TS
805
PROG0002.TS
806
PROG0003.TS
807

FIG.9

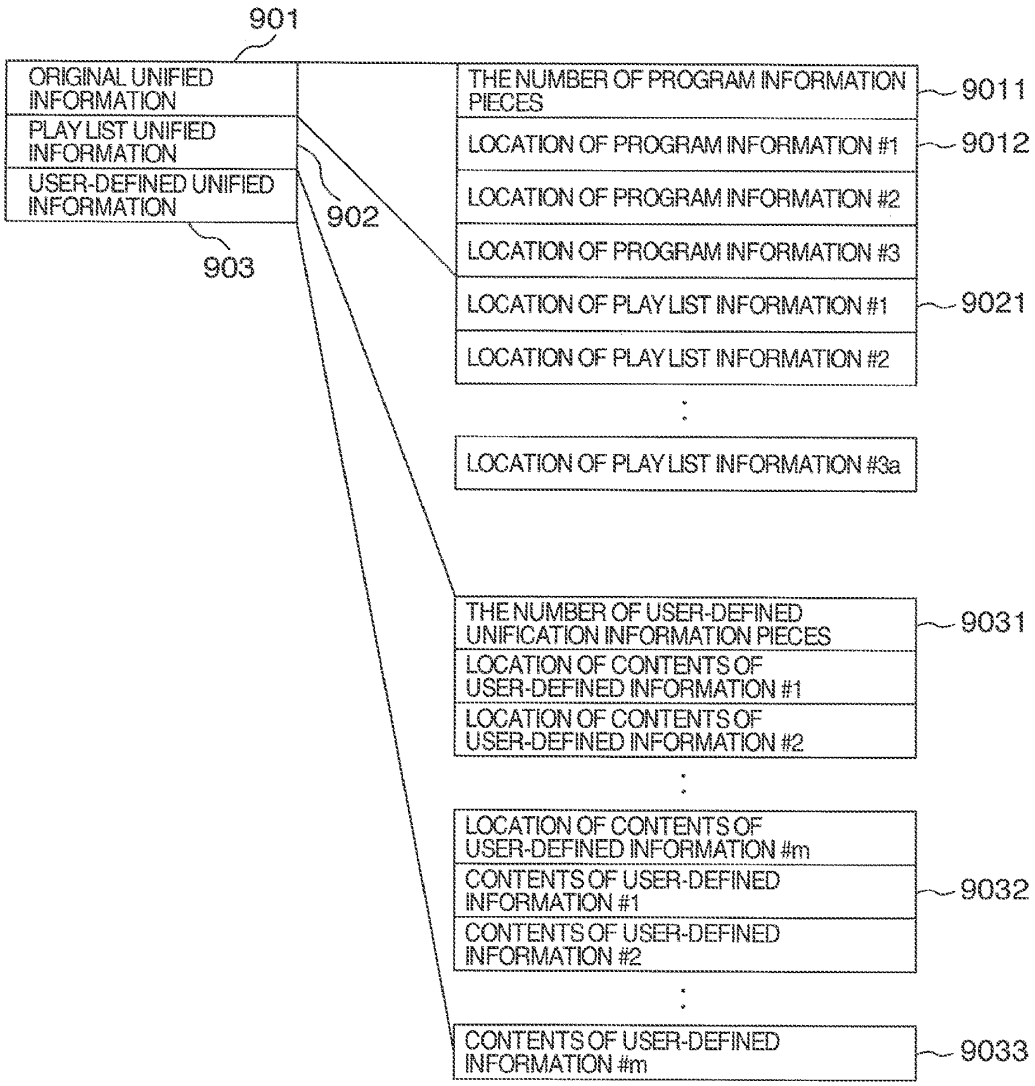

901
ORIGINAL UNIFIED INFORMATION
PLAY LIST UNIFIED INFORMATION
USER-DEFINED UNIFIED INFORMATION
902
903
THE NUMBER OF PROGRAM INFORMATION PIECES
9011
LOCATION OF PROGRAM INFORMATION #1
9012
LOCATION OF PROGRAM INFORMATION #2
LOCATION OF PROGRAM INFORMATION #3
LOCATION OF PLAY LIST INFORMATION #1
9021
LOCATION OF PLAY LIST INFORMATION #2
LOCATION OF PLAY LIST INFORMATION #3a
THE NUMBER OF USER-DEFINED UNIFICATION INFORMATION PIECES
9031
LOCATION OF CONTENTS OF USER-DEFINED INFORMATION #1
LOCATION OF CONTENTS OF USER-DEFINED INFORMATION #2
LOCATION OF CONTENTS OF USER-DEFINED INFORMATION #m
CONTENTS OF USER-DEFINED INFORMATION #1
9032
CONTENTS OF USER-DEFINED INFORMATION #2
CONTENTS OF USER-DEFINED INFORMATION #m
9033

FIG.10

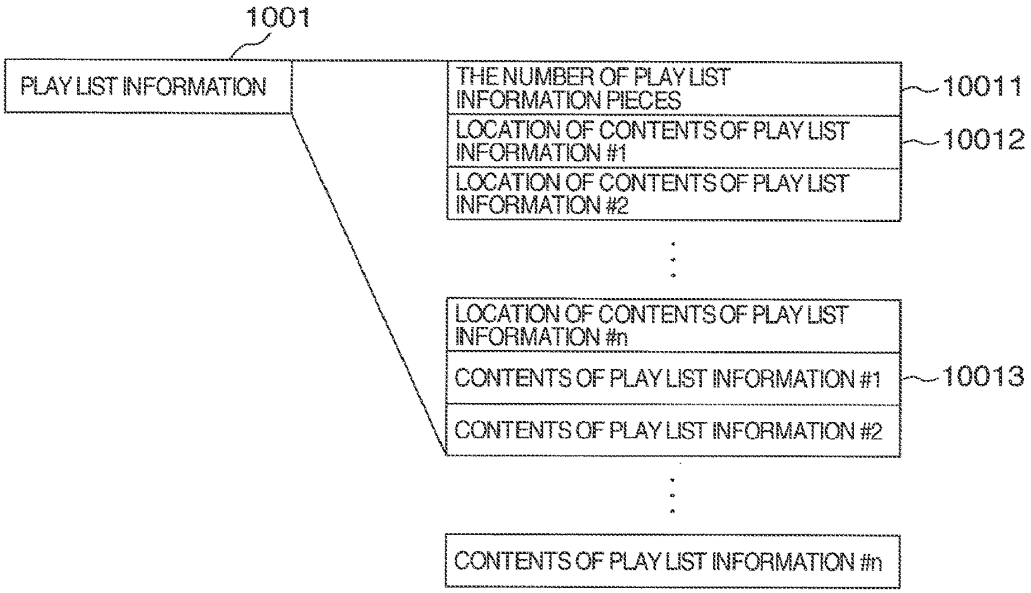

1001
PLAY LIST INFORMATION
THE NUMBER OF PLAY LIST INFORMATION PIECES
10011
LOCATION OF CONTENTS OF PLAY LIST INFORMATION #1
10012
LOCATION OF CONTENTS OF PLAY LIST INFORMATION #2
LOCATION OF CONTENTS OF PLAY LIST INFORMATION #n
CONTENTS OF PLAY LIST INFORMATION #1
10013
CONTENTS OF PLAY LIST INFORMATION #2
CONTENTS OF PLAY LIST INFORMATION #n

FIG.11

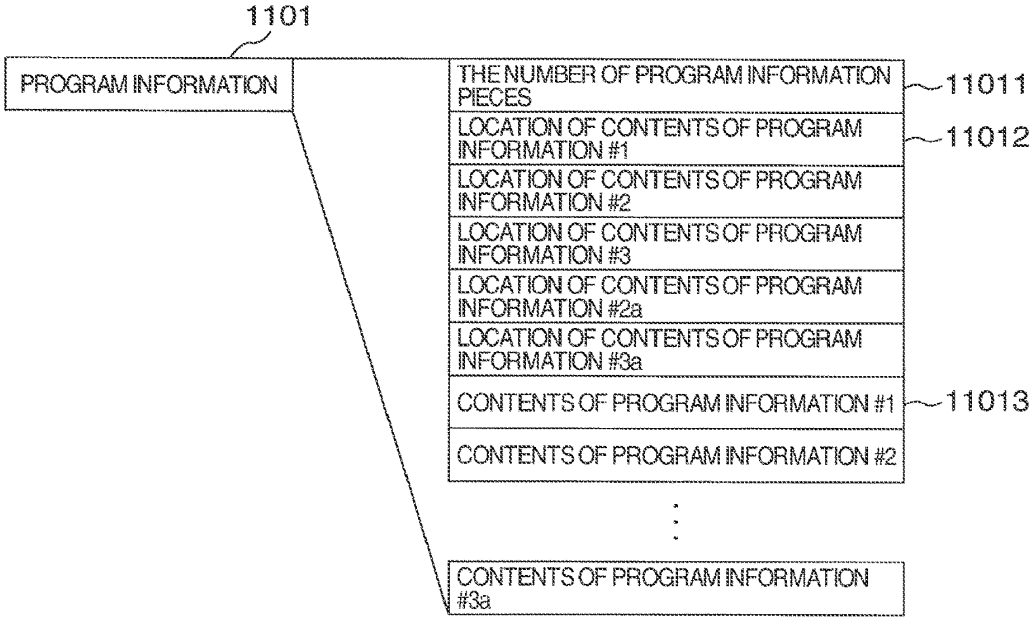

1101
PROGRAM INFORMATION
THE NUMBER OF PROGRAM INFORMATION PIECES
11011
LOCATION OF CONTENTS OF PROGRAM INFORMATION #1
11012
LOCATION OF CONTENTS OF PROGRAM INFORMATION #2
LOCATION OF CONTENTS OF PROGRAM INFORMATION #3
LOCATION OF CONTENTS OF PROGRAM INFORMATION #2a
LOCATION OF CONTENTS OF PROGRAM INFORMATION #3a
CONTENTS OF PROGRAM INFORMATION #1
11013
CONTENTS OF PROGRAM INFORMATION #2
CONTENTS OF PROGRAM INFORMATION #3a

FIG.12

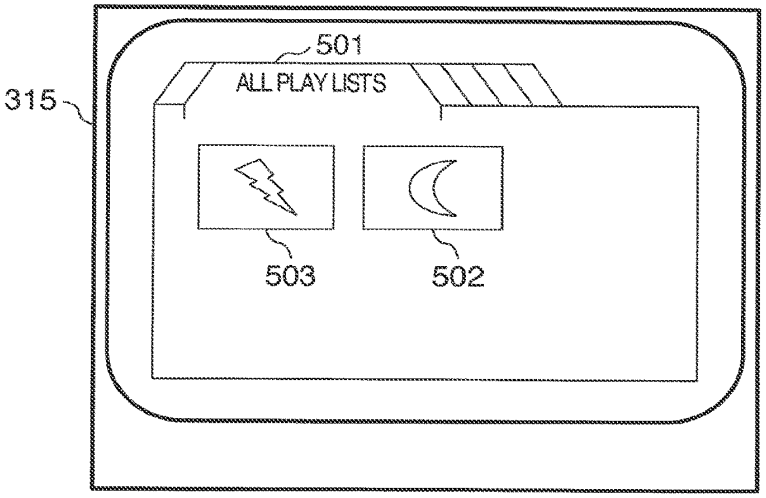
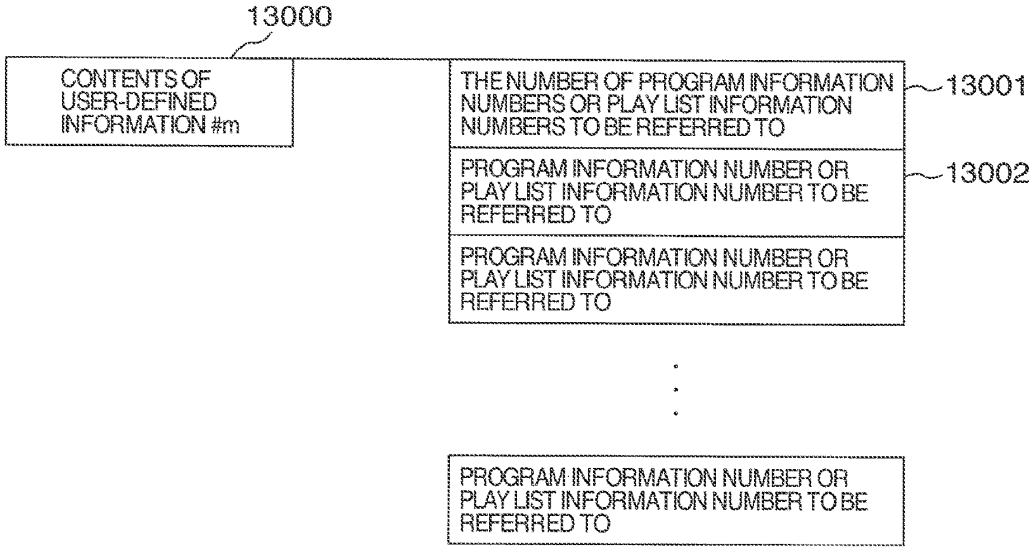

315
501
ALL PLAY LISTS
503
502

FIG.13


13000
CONTENTS OF USER-DEFINED INFORMATION #m
THE NUMBER OF PROGRAM INFORMATION NUMBERS OR PLAY LIST INFORMATION NUMBERS TO BE REFERRED TO
13001
PROGRAM INFORMATION NUMBER OR PLAY LIST INFORMATION NUMBER TO BE REFERRED TO
13002
PROGRAM INFORMATION NUMBER OR PLAY LIST INFORMATION NUMBER TO BE REFERRED TO
PROGRAM INFORMATION NUMBER OR PLAY LIST INFORMATION NUMBER TO BE REFERRED TO

EDITING METHOD AND RECORDING AND REPRODUCING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS(S)

This is a continuation application of U.S. patent application Ser. No. 16/221,908, filed Dec. 17, 2018, which is a continuation application of U.S. patent application Ser. No. 15/808,175, filed Nov. 9, 2017, which is a continuation application of U.S. patent application Ser. No. 15/176,435, filed Jun. 8, 2016, now U.S. Pat. No. 9,818,449, which is a continuation of U.S. patent application Ser. No. 14/141,417, filed Dec. 26, 2013, now U.S. Pat. No. 9,384,783 (the entire disclosure of which is incorporated herein by reference for all purposes), which is a continuation of U.S. patent application Ser. No. 12/567,898, filed Sep. 28, 2009, now U.S. Pat. No. 8,644,684 (the entire disclosure of which is incorporated herein by reference for all purposes), which is a continuation of U.S. patent application Ser. No. 11/203,457, filed on Aug. 11, 2005, now U.S. Pat. No. 7,613,383 (the entire disclosure of which is incorporated herein by reference for all purposes), which application claims priority from Japanese Patent Application Nos. JP2004-349264, filed Dec. 2, 2004, JP2004-378767, filed Dec. 28, 2004, and JP2004-378768, filed Dec. 28, 2004, the entire disclosures of which are incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a recording and reproducing device which records data onto a recording medium and reproduces data from the recording medium.

Description of the Related Art

As the high-efficiency coding technique advances, it has become possible to handle AV data such as video data and audio data as digital data, conduct code rate compression, and record resultant data on a large-capacity recording medium such as a hard disk or a recording type optical disk in real time. When digital data already compressed in code rate is inputted to a recording and reproducing device having such a recording medium from outside by broadcasting or communication, it is also possible to record the digital data on the recording medium intact.

In these recording and reproducing device, management information for managing digital data to be recorded is generated and recorded together onto the same recording medium. When a rewritable recording medium is used, the user can conduct editing work on the recording and reproducing device by rewriting the management information and generating and manipulating a list indicating the reproduction sequence (hereinafter referred to as play list) (see, for example, JP-A-2000-152180).

SUMMARY OF THE INVENTION

In the above-described conventional technique, it is mentioned that the play list indicates the reproduction sequence by linking portions of AV data together. As an example, a management state of AV data on a recording medium in the above-described conventional technique is shown in FIG. **2**.

Reference numeral **201** designates AV data themselves on the recording medium. The case where a program #1 to a program #3 are present as recording units is shown. Reference numeral **202** designates a second management hierarchical level (management level 2) in management information. Original cell information #1 to original cell information #3 indicate the whole reproduction range of program units, i.e., a program #1 to a program #3, respectively. Each of user-defined cell information #1 to user-defined information #2 indicates a reproduction range of the whole or a part of a program arbitrarily specified by the user. The number of the user-defined cell information #1 to user-defined information #2 is increased or decreased by the user's editing manipulation. Reference numeral **203** designates a first management hierarchical level (management level 1). Program information contains all of the original cell information #1 to original cell information #3. By conducting reproduction on the basis of the program set information, the user can reproduce all AV data recorded on the recording medium. Play list information #1 to play list information # k indicate a reproduction sequence of the user-defined cell information arbitrarily specified by the user. It is possible to have a plurality of reproduction sequences. Inside of a frame **204** becomes original information for managing the whole AV data in the management information. Inside of a frame **205** becomes user-defined information for managing the play list obtained by the user's editing manipulation.

In FIG. **2**, the play list information is placed on the same level with the program set information and managed as the management level 1. Therefore, the sequence of a plurality of play list information pieces themselves is determined uniquely. For example, as for a catalog of the play lists, it is impossible on the user's interface to alter the display sequence. In view of the problem, the present invention has been achieved. An object of the present invention is to provide a recording scheme and device in which the user can conduct manipulation of arbitrarily rearranging the display sequence of the play lists in the play list catalog on the user interface.

Furthermore, in the conventional technique example, attention is not paid to that a plurality of users generate, select and manage favorite play list information. For example, even when a plurality of users desire to generate, select and manage respective favorite play list information pieces, it cannot be implemented. Furthermore, attention is not especially paid to that a user select some arbitrary play lists from among a plurality of play lists and manage them.

In view of these problems, the present invention has been achieved. An object of the present invention is to provide a recording and reproducing device in which the user can select and manage arbitrary play lists.

In order to achieve the objects, in accordance with the present invention, a unit of management for managing all registered play list information and an upper management hierarchical level are added. The unit of management is adapted to be handled on the same level with unified information that indicates a reproduction range of all AV data. User-defined unified information is adapted to be handled on the added management hierarchical level. The user-defined unified information is formed to allow arbitrary reproduction ranges contained on a lower hierarchical level to be registered.

In a recording and reproducing device according to the present invention, it becomes possible for the user to select arbitrary play lists or reproduction ranges and conduct management. Even in the case where a plurality of users share a single recording medium, therefore, each user can

manage favorite reproduction contents, resulting in improved usage. Since the play lists are subject to unified management, it becomes possible for the user to arbitrarily alter the display sequence of play lists.

According to the present invention, a recording and reproducing device improved in usage can be provided.

Other objects, features and advantages of the invention will become apparent from the following description of the embodiments of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a management state of AV data in a recording and reproducing device according to an embodiment of this invention;

FIG. **2** shows a management state of AV data in a conventional technique example;

FIG. **3** shows a block diagram of a recording and reproducing device according to an embodiment of this invention;

FIG. **4** shows a display output example of original unified information;

FIG. **5** shows a display output example of play list unified information;

FIG. **6** shows a first output example of user-defined unified information;

FIG. **7** shows a second output example of user-defined unified information;

FIG. **8** shows an example of a file structure of original unified information, play list unified information, user-defined unified information, play list information, program information, and AV data (program);

FIG. **9** shows an example of a management table structure of original unified information, play list unified information, and user-defined unified information;

FIG. **10** shows an example of a management table of play list information;

FIG. **11** shows an example of a management table of program list information;

FIG. **12** shows a display output example of play list unified information; and

FIG. **13** shows an example of a table indicating contents of user-defined information # m.

DESCRIPTION OF THE EMBODIMENTS

Hereafter, embodiments of the present invention will be described with reference to the drawings. FIG. **1** shows a management state of AV data on a recording medium in a recording and reproducing device according to the present invention. In the same way as the reference numeral **201** in FIG. **2**, reference numeral **101** designates AV data themselves on the recording medium. The case where programs #1 to #3 are present as recording units is shown.

Reference numeral **102** corresponds to **202** in FIG. **2**. However, reference numeral **102** designates a third management hierarchical level (management level 3) in management information. Program information #1 to program information #3 indicate the whole reproduction ranges of program units, i.e., program #1 to program #3, respectively. Each of program information #2a to program information #3a indicates a reproduction range of the whole or a part of a program arbitrarily specified by the user. The program information #2a to program information #3a indicate a part of the program #2 and a part of the program #3, respectively. In places corresponding to the program information #1 to program information #3, information is also added, as AV data is added, i.e., with an increase in programs. In places corresponding to the program information #2a to the program information #3a, the number of information pieces increases or decreases due to the editing manipulation of the user.

Reference numeral **103** corresponds to the management level 1 in FIG. **2**. However, numeral **103** designates a second management hierarchical level (management level 2), which includes only play list information #1 to play list information # n. Each play list information indicates a reproduction sequence of arbitrary program information pieces on the management level 3. It is possible to have a plurality of reproduction sequences.

Reference numeral **104** designates a newly added first management hierarchical level (management level 1) in the management information as a feature point of the present invention. The management level 1 includes a plurality of unified information pieces. Original unified information corresponds to the program set information shown in FIG. **2**. The original unified information contains all of the program information #1 to program information #3 on the management level 3. By conducting reproduction on the basis of all of the program information #1 to program information #3, it becomes possible for the user to reproduce all AV data recorded on the recording medium. Play list unified information contains all of the play list information #1 to play list information # n on the management level 2. By conducting reproduction on the basis of all of the play list information #1 to play list information # n on the management level 2, it becomes possible for the user to successively reproduce all registered play lists. User-defined unified information #1 to user-defined unified information # m contain arbitrary one or more from among play list information pieces on the management level 2 and program information pieces on the management level 3. For example, when a plurality of users use a single recording medium, it becomes possible to manage reproduced contents that meet respective users' tastes by using one user-defined unified information every user.

An embodiment of a recording and reproducing device according to the present invention will be described more specifically by using another drawing.

FIG. **3** is a block diagram showing an example of a recording and reproducing device according to the present invention. A recording and reproducing device capable of receiving digital broadcast, recording the digital broadcast on a recording medium, reproducing recorded data, and obtaining a reproduced output is shown. Reference numeral **300** designates a recording and reproducing device, **301** an input terminal supplied with a received wave from an antenna, **3011** an input terminal supplied with compressed video and audio data from another device, **3012** an analog video input terminal supplied with an analog video signal, **3013** an analog audio input terminal supplied with an analog audio input terminal, **333** and **334** analog/digital (A/D) conversion circuits each of which converts an analog signal to a digital signal, **302** a demodulation circuit, **330** a separation circuit which separates the demodulated digital signal into audio, video and other data, **335** a compression circuit which compresses digitized video and audio signals, **303** a recording unit signal processing circuit, **331** an encryption circuit which encrypts data to be recorded, **304** a recording and reproducing unit including a drive function of a recording medium, **305** a recording medium, **332** a decryption circuit which decrypts data encrypted and recorded on the recording medium, **306** a reproducing unit signal processing circuit, **307** a switchover circuit, **308** a separation circuit,

309 a video decoding circuit, **310** a digital/analog (D/A) conversion circuit, **311** a video output terminal, **312** an audio decoding circuit, **313** a D/A conversion circuit. **314** an audio output terminal, **315** a TV set, **316** a user I/F, **317** a control unit, **318** a system bus, **319** an OSD generation unit, and **320** an addition circuit.

At the time of recording, a signal transmitted by digital broadcast or the like and received is demodulated in the demodulation circuit **302** by using a predetermined scheme, subjected to necessary signal processing such as timing adjusting data addition and modulation in the recording unit signal processing circuit **303**, encrypted in the encryption circuit **331**, and then recorded on the recording medium **305** by the recording and reproducing unit **304**. A digital signal input from the digital input terminal **3011** is subjected to necessary signal processing such as timing adjusting data addition and modulation in the recording unit signal processing circuit **303**, encrypted in the encryption circuit **331**, and then recorded on the recording medium **305** by the recording and reproducing unit **304**. An analog video signal input from the analog video input terminal **3012** and an analog audio signal input from the analog audio input terminal **3013** are subjected to compression processing in the compression circuit **335**, encrypted in the encryption circuit **331** via the recording unit signal processing circuit **303**, and then recorded on the recording medium **305** by the recording and reproducing unit **304**.

At the time of reproducing, encrypted digital data read out from the recording medium **305** via the recording and reproducing unit **304** in accordance with the user's order is decrypted in the decryption circuit **332**, subjected to signal processing required for reproduction such as demodulation in a form based on a predetermined modulation scheme in the reproducing unit signal processing circuit **103**, and sent to the separation circuit **308** via the switchover circuit **307**. Resultant video digital data is subjected to predetermined video decoding processing in the video decoding circuit **309**, converted to an analog signal in the D/A conversion circuit **310**, and then displayed as a monitor output on the TV set **315** via the video output terminal **311**. Audio digital data obtained from the separation circuit **308** is subjected to predetermined audio decoding processing in the audio decoding circuit **312**, converted to an analog signal in the D/A conversion circuit **313**, and then outputted by an audio output mechanism in the TV set **315** via the audio output terminal **314**.

The control unit **317** controls various components in the recording and reproducing device **300** via the system bus **318**. Furthermore, the control unit **317** controls the whole device to cause operation based on the user's order input which is inputted via the user I/F **316** to be conducted. By the way, an order input request to the user or necessary OSD display for the user is implemented by preparing it in the OSD generation unit **319**, adding it to an output of the video decoding circuit **309** on a suitable level, and finally outputting it to a monitor screen on the TV set **315**.

The case where each unified information on the management level 1 is used for menu display of recording data will now be described as a specific use example of the management information configuration in FIG. **1**.

FIG. **4** shows an example in which menu display is conducted by using the original unified information shown in FIG. **1**. Reference numeral **315** designates the TV set shown in FIG. **3**, **401** a tag for displaying all programs, **402** a thumbnail indicating program information #1, **403** a thumbnail indicating program information #2, and **404** a thumbnail indicating program information #3. The user moves a cursor position on the screen to a desired thumbnail and conducts selection and determination by using a remote controller or the like. As a result, the user can reproduce arbitrary programs or all programs.

FIG. **5** shows an example in which menu display is conducted by using the play list unified information shown in FIG. **1**. Reference numeral **501** designates a tag for displaying all play lists, **502** a thumbnail indicating play list information #1, and **503** a thumbnail indicating play list information #2. In the same way as the above-described case, the user moves a cursor position on the screen to a desired thumbnail and conducts selection and determination by using a remote controller or the like. As a result, the user can reproduce arbitrary play lists or all play lists. By the way, display switching from the all program display tag **401** to all play list display tag can be implemented by, for example, movement of the cursor in tag character positions conducted by the user.

FIG. **6** shows an example in which menu display is conducted by using the user-defined unified information #1 shown in FIG. **1**. Reference numeral **601** designates a menu display tag for user #1 (who is supposed to be "mother" here). As appreciated from FIG. **1**, reference numerals **402** and **502** designate thumbnails indicating the program information #1 and the play list information #1, respectively. The "mother" can use the menu display tag for mother **601** as a folder dedicated to herself, and freely register and delete data to be reproduced. In the same way, FIG. **7** shows an example in which menu display is conducted by using the user-defined unified information #2 shown in FIG. **1**. Reference numeral **701** designates a menu display tag for user #2 (who is supposed to be "father" here). As appreciated from FIG. **1**, reference numerals **503** and **502** designate thumbnails indicating the play list information #2 and the play list information #1, respectively. In this case, the "father" selects two play lists. However, the reproduction sequence of them can be altered. In the same way as the "mother," the "father" can use the menu display tag for father **701** as a folder dedicated to himself, and freely register and delete data to be reproduced.

As heretofore described, in the embodiment of the present invention, a unit of management for managing all registered play list information and an upper management hierarchical level are added. The unit of management is adapted to be handled on the same level with unified information that indicates a reproduction range of all AV data. User-defined unified information is adapted to be handled on the added management hierarchical level. The user-defined unified information is formed to allow arbitrary reproduction ranges contained on a lower hierarchical level to be registered therein. As a result, it becomes possible for the user to select arbitrary play lists or reproduction ranges and conduct management. Even in the case where a plurality of users share a single recording medium, therefore, each user can manage favorite reproduction contents, resulting in improved usage.

In the embodiment heretofore described, the case where digital broadcast is received and digital data is recorded intact has been described. However, this is not restrictive. A configuration having a network I/F to acquire AV data from an external network or having coding unit to conduct recording onto the recording medium while coding analog data may also be used. In other words, the present embodiment refers to data management on the recording medium, and its input route is not especially restricted.

FIG. **8** shows an example of file configurations used to actually record the program, program information, play list

information, original unified information, play list unified information, and user-defined information on the recording medium **305** (FIG. **3**). The recording medium is a medium on which digital recording and reproducing are conducted. Files on the medium are managed by a file system similar to that used to manage a recording medium in the so-called personal computer or the like. In FIG. **8**, "ROOT" **800** represents a highest hierarchical level of a file directory. "TV_REC" **801** is a directory under the highest hierarchical level. "TVREC.MAN" **802**, "PGRG.IFO" **803**, "PGR.IFO" **804**, "PROG0001.TS" **805**, . . . of files which implement the management structure shown in FIG. **1** according to the present invention are recorded in the "TV_REC" **801**. In the "TVREC.MAN" **802**, the original unified information, the play list unified information, and the user-defined unified information #1 to # m on the management level 1 shown in FIG. **1** are described as management tables. In the "PGRG.IFO" **803**, the play list information #1 to the play list information # n on the management level 2 shown in FIG. **1** are recorded as management tables. In the "PGR.IFO" **804**, the program information #1 to the program information #3a on the management level 3 shown in FIG. **1** are recorded as management tables. "PROG0001.TS" **805**, "PROG0002.TS" **806** and "PROG0003.TS" **807** are entity files of AV data in each program. For example, AV data between recording start and recording end of one time is recorded in the "PROG0001.TS." AV data between recording start and recording end of the next time is recorded in the "PROG0002.TS." In this way, the file name is updated and recording is conducted. Thereafter, the management files **802** to **804** are updated.

The file structure and the configuration of management tables themselves concerning the management structure "TVREC.MAN" **802**, "PGRG.IFO" **803**, "PGR.IFO" **804**, "PROG0001.TS" **805**, . . . of files may be formed by using any method. However, an example of how to implement the management configuration in the case of FIG. **1** using the files will now be described.

FIG. **9** shows a configuration of management tables of the "TVREC.MAN" **802** (FIG. **8**). As original unified information **901**, the number of AV data recorded as the number of program information pieces **9011**, i.e., the total number (three in this case) of entity files ("PROG0001.TS" **805**, "PROG0002.TS" **806** and "PROG0003.TS" **807**) of the AV data is described. Under the original unified information **901**, location tables **9012** of respective original program information pieces are recorded. As play list unified information **902**, play list location information tables are recorded in **9021** and subsequent tables. In **9031**, the number of user-defined unified information pieces is recorded. After that, contents of #1 to # m of the user-defined information are recorded.

FIG. **13** shows contents of the user-defined information # m described above. The user-defines information # m has combinations of original program information and play list information as a table.

FIG. **10** shows a management table of the "PGRG.IFO" **803** (FIG. **8**), which corresponds to the management level 2 shown in FIG. **1**. As play list information **1001**, the total number of the play list information pieces is first described as designated by **10011**. (In this case, the total number of the play list information pieces is n.) Beginning with **10012** indicated under the reference numeral **10011**, locations in which contents of the play list information #1 to # n are described are recorded as tables. Beginning with **10013**, contents of the play list information #1 to # n (contents of the reproduction sequence, which are management tables having combinations of program information indicating the reproduction start location and reproduction end location of AV data described later) are recorded.

FIG. **11** shows a management table of the "PGR.IFO" **804** (FIG. **8**), which corresponds to the management level 3 shown in FIG. **1**. As program information **1101**, the total number of the program information pieces including all of the program information pieces paired with the original information program #1, #2 and #3 (FIG. **1**) and the user-defined program information #2a and #3a (FIG. **1**) is recorded as designated by **11011**. Beginning with **11012** indicated under the reference numeral **11011**, tables indicating locations in which contents of the program information #1 to #3a are described are recorded. Beginning with **11013**, contents of the program information #1 to #3a (describing the reproduction start location and reproduction end location of the "PROG0001.TS" **805**, "PROG0002.TS" **806** and "PROG0003.TS" **807** (FIG. **8**)) are recorded.

By conducting the management as heretofore described, it becomes possible to sort the location information, for example, in the play list location table **9021** and alter the sequence of displaying play lists on a GUI view from the state shown in FIG. **5** to the state shown in FIG. **12**. In the case where the number of play lists has become very large, a play list that is high in user's use frequency can be displayed in the first place in the GUI view. As a result, it is possible to implement a usable recording and reproducing device, reproducing device, or recording method. For example, a plurality of users can set play lists that they want to view and recorded original contents freely and individually. Even when the number of recorded programs is very large, the user can rapidly find out a program that the user wants to view, because the user can refer to a folder defined by the user.

In the present embodiment, a clear distinction is made between the user-defined play list unified information and the user-defined unified information #1 to # m. The user-defined play list unified information may be defined as user-defined play list unified information having no link to the original program information of the user-defined unified information.

It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.

The invention claimed is:

1. An information processing apparatus comprising:

a network interface;

a recording medium on which is stored a plurality of video information including first video information received wirelessly by the network interface over a network from another information processing apparatus, wherein at least some of the plurality of video information is associated with a user profile;

a display; and

a processor for controlling the display to display:

a first area including a first character associated with a first group of video information for a first classification and a second character associated with a second group of video information for a second classification different from the first classification, the first group of video information being configured to allow a user to edit, wherein the first group of video information and the second group of video information are part of the plurality of stored video information, and

a second area displaying thumbnails corresponding to at least a portion of the plurality of stored video information,

wherein user selection of the first character enables the display of a first group of thumbnails corresponding to the first group of video information in the second area,

wherein user selection of the second character enables the display of a second group of thumbnails corresponding to the second group of video information in the second area,

wherein, upon one video information stored on the recording medium included in both the first group of video information and the second group of video information being deleted from the first group of video information, the one video information continues to be included in the second group of video information and the processor controls the display to display a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected.

2. The information processing apparatus of claim **1**, further comprising:

wherein the processor generates a group of video information based on user preferences determined by the user selections of the video information, and

wherein, upon user selection of the group, the processor controls the display to display thumbnails that correspond to the video information and no other thumbnails associated with video information of other users.

3. The information processing apparatus of claim **1**, further comprising:

an antenna for wirelessly receiving the first video information from the other information processing apparatus.

4. The information processing apparatus of claim **1**,

wherein the plurality of stored video information includes third video information recorded by the information processing apparatus, fourth video information, and fifth video information,

wherein the display displays a user interface having thumbnails corresponding to each of the third, fourth, and fifth video information.

5. The information processing apparatus of claim **4**,

wherein the display displays the third, fourth, and fifth video information according to predetermined playback sequence.

6. The information processing apparatus of claim **1**,

wherein the plurality of stored video information includes third video information, fourth video information, and fifth video information,

wherein the plurality of stored video information includes management information corresponding to the third, fourth, and fifth video information,

wherein the management information includes filename information and timing information for each of the third, fourth, and fifth video information such that when the third, fourth, and fifth video information is stored in the recording medium the filename information is updated according to a predetermined sequence.

7. The information processing apparatus of claim **1**, further comprising:

an analog to digital converter for converting analog audio information being recorded into digital audio information;

a compressor for compressing the plurality of video information including digital video information and the digital audio information;

a decoder for decoding, during playback, the compressed digital video information and the compressed digital audio information included in the plurality of stored video information and selected for reproduction by the user; and

a digital to analog converter for converting at least the decoded digital audio information into analog audio information during playback.

8. The information processing apparatus of claim **1**, further comprising:

an on screen display generator generating on screen display information, wherein the plurality of stored video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.

9. An information processing method implemented on an information processing apparatus, the information processing method comprising:

storing a plurality of video information including first video information received wirelessly by a network interface over a network from another information processing apparatus, wherein at least some of the plurality of video information is associated with a user profile; and

displaying:

a first area including a first character associated with a first group of video information for a first classification and a second character associated with a second group of video information for a second classification different from the first classification, the first group of video information being configured to allow a user to edit, wherein the first group of video information and the second group of video information are part of the plurality of stored video information, and

a second area displaying thumbnails corresponding to at least a portion of the plurality of stored video information,

wherein user selection of the first character enables the display of a first group of thumbnails corresponding to the first group of video information in the second area, and

wherein user selection of the second character enables the display of a second group of thumbnails corresponding to the second group of video information in the second area;

upon one video information stored on the recording medium included in both the first group of video information and the second group of video information being deleted from the first group of video information, the one video information continues to be included in the second group of video information, and displaying a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected;

wherein the processor generating a group of video information based on user preferences determined by the user selections of the video information, and

upon user selection of the group, displaying thumbnails that correspond to the video information and no other thumbnails associated with video information of other users.

10. The information processing method of claim **9**, further comprising:

wirelessly receiving the first video information from the other information processing apparatus via an antenna of the information processing apparatus.

11. The information processing method of claim **9**,

wherein the plurality of stored video information includes third video information recorded by the information processing apparatus, fourth video information, and fifth video information,

wherein the information processing apparatus displays a user interface having thumbnails corresponding to each of the third, fourth, and fifth video information.

12. The information processing method of claim **11**,

wherein the information processing apparatus displays the third, fourth, and fifth video information according to predetermined playback sequence.

13. The information processing method of claim **9**,

wherein the plurality of stored video information includes third video information, fourth video information, and fifth video information,

wherein the plurality of stored video information includes management information corresponding to the third, fourth, and fifth video information,

wherein the management information includes filename information and timing information for each of the third, fourth, and fifth video information such that when the third, fourth, and fifth video information is stored in the recording medium the filename information is updated according to a predetermined sequence.

14. The information processing method of claim **9**, further comprising:

converting, by an analog to digital converter of the information processing apparatus, analog audio information being recorded into digital audio information;

compressing, by a compressor of the information processing apparatus, the plurality of video information including digital video information and the digital audio information;

decoding, during playback and by a decoder of the information processing apparatus, the compressed digital video information and the compressed digital audio information included in the plurality of stored video information and selected for reproduction by the user; and

converting, by a digital to analog converter of the information processing apparatus, at least the decoded digital audio information into analog audio information during playback.

15. The information processing method of claim **9**, further comprising:

generating, by the information processing apparatus, on screen display information,

wherein the plurality of stored video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.

16. A method for reproducing video content associated with user profiles being implemented on an information processing apparatus, comprising:

receiving, via a network, first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;

displaying, on a display device, a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character, the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;

receiving a selection of the first user profile;

displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information, the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user of the first user profile, the second user interface further displaying thumbnails corresponding to the first group of video information;

displaying the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected, the first group of video information and the second group of video information including one video information that is the same;

receiving a selection to remove the one video information from the first group of video information associated with the first user profile;

removing the one video information from the first group of video information, wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected;

receiving a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, the desired video information included in the second video information;

decrypting video information corresponding to the selected thumbnail; and

displaying the decrypted video information.

17. The method of claim **16**,

wherein any user can delete stored video information regardless of a user profile from the plurality of user profiles that was used to record the stored video information.

18. The method of claim **16**, further comprising:

generating a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.

19. The method of claim **16**, further comprising:

generating a list of video information based on preferences of a user determined by a user selections of thumbnails associated with the first video information, the list including third video information;

receiving a selection of the list by the user; and

in response to the selection of the list, displaying the thumbnails that correspond to the third video information and no other thumbnails associated with video information of other users.

20. The method of claim **16**, further comprising:

generating on screen display information, wherein the first video information includes third video information

such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.

21. An information processing apparatus comprising:

a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;

a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character, the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;

an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,

wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information, the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with, the second user interface further displaying thumbnails corresponding to the first group of video information, and

wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected, the first group of video information and the second group of video information including one video information that is the same; and

a processor for removing one video information from the first group of video information after the input interface receives a selection to remove the one video information from the first group of video information associated with the first user profile, wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,

wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and

wherein the display displays the decrypted video information.

22. The information processing apparatus of claim **21**, further comprising:

an antenna for wirelessly receiving the first video information.

23. The information processing apparatus of claim **21**,

wherein any user can delete stored video information regardless of a user profile from the plurality of user profiles that was used to record the stored video information.

24. The information processing apparatus of claim **21**,

wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.

25. The information processing apparatus of claim **21**,

wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails associated with the first video information, the list including third and fourth video information, and, in response to the input interface receiving a selection of the list by the user, the display displays only those thumbnails that correspond to the third and fourth video information and no other thumbnails associated with video information of other users.

26. The information processing apparatus of claim **21**, further comprising:

an analog to digital converter for converting analog audio information being recorded into digital audio information;

a compressor for compressing the first video information;

a decoder for decoding, during playback, audio and video information included in the first video information and selected for reproduction by the user; and

a digital to analog converter for converting at least the digital audio information into audio information during playback.

27. The information processing apparatus of claim **21**, further comprising:

an on screen display generator generating on screen display information,

wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.

* * * * *