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(54) Information editing apparatus, information editing method, and information recording medium

Informationsschnittgerät, Informationsschnittverfahren und Informationsaufzeichnungsmedium

Appareil de montage d’informations, méthode de montage d’informations et support d’enregistrement d’informations

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- PATENT ABSTRACTS OF JAPAN vol. 014, no. 482 (P-1119), 19 October 1990 (1990-10-19) & JP 02 194455 A (MATSUSHITA ELECTRIC IND CO LTD), 1 August 1990 (1990-08-01)

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Description

[0001] The present invention relates to a technical field of an information editing apparatus, an information editing method, and an information recording medium on which a program for controlling edit is recorded so as to be read by a computer. More particularly, the invention relates to a technical field of an information editing apparatus and method for editing recording information already recorded on a write-once recording medium, and an information recording medium on which a program for controlling edit is recorded so as to be read by a computer.

[0002] US-A-6 138 203 discloses a CD-R recorder which detects the remaining capacity of a recording medium and indicates, whether or not, data resulting from an editing process prepared by the user may be recorded on that medium.

[0003] As the recording density of a recording medium such as an optical disk is increasing in recent years, the recording density of a recording medium on which information can be recorded only once but cannot be overwritten (hereinafter, referred to as a write-once recording medium), such as what is called a DVD-R (DVD-Recordable) is also becoming remarkably higher.

[0004] The recording information recorded on the write-once recording medium usually includes not only the recording information itself such as music information or image information to be reproduced but also reproduction control information (generally, also called navigation information) indicative of a reproduction mode, which is specifically a reproduction order of plural recording information, the number of reproduction times, a reproduction range, or the like.

[0005] Assuming now that an editing process of deleting all or a part of recording information already recorded on the write-once recording medium, since information can be written only once to the write-once recording medium as described above, the original reproduction control information is not overwritten with the edited reproduction control information but the whole edited reproduction control information is quite separately and newly recorded in an available area at that time.

[0006] When the editing process is seen from the user's point of view, however, the available capacity decreases in spite of no newly added recording information. Finally, although any recording information is not additionally increased, the editing process becomes to be impossible.

[0007] In this case, a problem occurs such that the user who has repeated the editing process misunderstands or erroneously recognizes the editing process which becomes impossible to be performed as a failure of the information editing apparatus.

[0008] Since the editing process becomes impossible to be performed without any information provided, there is also a problem such that an unnecessary and preliminary editing process is repeated and a necessary editing process cannot be executed.

[0009] The present invention has been made in view of the above problems and its object is to provide an information editing apparatus and method capable of preventing the user from erroneously recognizing that the editing process can be performed and capable of allowing a necessary editing process to be effectively executed, and an information recording medium on which a program for controlling edit is recorded so as to be read by a computer.

[0010] This is achieved by the features of claim 1 for an information editing apparatus, the features of claim 4 for an information editing method and the features of claim 7 for an information recording medium on which a program for controlling an edit operation is recorded.

[0011] Further embodiments are the subject-matter of dependent claims.

[0012] According to the present invention, since whether the recording information recorded on the write-once recording medium can be edited or not is notified, the user can recognize the state before executing an actual editing process. Consequently, in the case of editing recording information already recorded on the recording medium, the user can be prevented from erroneously recognizing that the information cannot be edited even if a remaining capacity decreases regardless of additionally recording new recording information, and a necessary edit can be effectively executed.

[0013] In one aspect of the present invention, said determining device determines the number of times said recording information can be edited after said determination, and said notifying device notifies said determined number of times.

[0014] According to this aspect, the user can recognize the specific number of times information can be edited before executing an actual edit.

[0015] In another aspect of the present invention, said determining device determines whether said recording information can be edited or not after said determination, and said notifying device notifies whether said recording information can be edited or not.

[0016] According to this aspect, the user can therefore recognize whether the information can be edited or not before executing an actual edit.

[0017] In further aspect of the present invention, editing of said recording information is deletion of all or a part of said recording information recorded on said recording medium.

[0018] According to this aspect, the user can therefore recognize whether recording information can be deleted or not before deleting a part or all of the recording information recorded.

[0019] In further aspect of the present invention, said information to be recorded in said unrecorded area including reproduction control information for preventing said deleted recording information from being reproduced.

[0020] According to this aspect, the reproduction con-
lording information to make the information apparently deleted in the reproduction information after the deleting process is recorded.

[0021] The above object of the present invention can be achieved by an information editing method of the present invention of editing recording information already recorded on a recording medium on which information can be recorded only once.

[0022] According to the present invention, since whether recording information recorded on a write-once recording medium can be edited or not is notified, the user can recognize it before executing an actual edit. Consequently, in the case of editing recording information already recorded on the recording medium, the user can be prevented from erroneously recognizing that the information cannot be edited even if a remaining capacity decreases regardless of additionally recording new information, and a necessary edit can be effectively executed.

[0023] In one aspect of the present invention, the number of times said recording information can be edited after said determination is determined in said determining process, and said determined number of times is notified in said notifying process.

[0024] According to this aspect, the user can therefore recognize the specific number of times information can be edited before executing an actual edit.

[0025] In another aspect of the present invention, whether said recording information can be edited or not is determined after said determination in said determining process, and whether said recording information can be edited or not is notified in said notifying process.

[0026] According to this aspect, the user can therefore recognize whether the information can be edited or not before executing an actual edit.

[0027] In further aspect of the present invention, editing of said recording information is deletion of all or a part of said recording information recorded on said recording medium.

[0028] According to this aspect, the user can therefore recognize whether recording information can be deleted or not before deleting a part or all of the recording information recorded.

[0029] In further aspect of the present invention, said information to be recorded in said unrecorded area including reproduction control information for preventing said deleted recording information from being reproduced.

[0030] According to this aspect, the reproduction control information to make the information apparently deleted in the reproduction information after the deleting process is recorded.

[0031] The above object of the present invention can be achieved by an information recording medium of the present invention on which a program for controlling an edit is recorded so as to be read by an editing computer included in an information editing apparatus of editing recording information already recorded on a recording medium on which information can be recorded only once.

[0032] According to the present invention, since the editing computer is allowed to function to notify of whether recording information recorded on a write-once recording medium can be edited or not, the user can recognize the state before executing an actual edit. Consequently, in the case of editing recording information already recorded on the recording medium, the user can be prevented from erroneously recognizing that the information cannot be edited even if a remaining capacity decreases regardless of additionally recording new recording information, and a necessary edit can be effectively executed.

[0033] In one aspect of the present invention, said determining device determines whether said recording information can be edited or not after said determination, and said notifying device notifies said determined number of times.

[0034] According to the present invention, the user can therefore recognize the specific number of times information can be edited before executing an actual edit.

[0035] In another aspect of the present invention, said determining device determines whether said recording information can be edited or not after said determination, and said notifying device notifies whether said recording information can be edited or not.

[0036] According to this aspect, the user can therefore recognize whether the information can be edited or not before executing an actual edit.

[0037] In further aspect of the present invention, editing of said recording information is deletion of all or a part of said recording information recorded on said recording medium.

[0038] According to the present invention, the user can therefore recognize whether recording information can be deleted or not before deleting a part or all of the recording information recorded.

[0039] In further aspect of the present invention, said information to be recorded in said unrecorded area including reproduction control information for preventing said deleted recording information from being reproduced.

[0040] According to this aspect, the reproduction control information to make the information apparently deleted in the reproduction information after the deleting process is recorded.

Fig. 1 is a diagram showing a deleting process in a DVD-R 1.

Fig. 2 is a diagram showing a concrete example of an information amount of a border-out area.

Fig. 3 is a block diagram showing a schematic configuration of an information recording/reproducing apparatus of an embodiment of the present invention.

Fig. 4 is a flowchart (I) of an editing process of the embodiment.
Fig. 5 is a flowchart (II) of an editing process of the embodiment;
Fig. 6A is a diagram showing concrete example (I) of a setup screen of an edit menu;
Fig. 6B is a diagram showing concrete example (I) of a setup screen of an edit menu with indication of the number of times information can be edited;
Fig. 7A is a diagram showing a concrete example (II) of a setup screen of individual edit screens;
Fig. 7B is a diagram showing a concrete example (II) of a setup screen of an edit menu of individual edit.
Fig. 8A is a diagram showing a concrete example (III) of a setup screen of an execution confirmation screen;
Fig. 8B is a diagram showing a concrete example (III) of a setup screen of a warning screen;
Fig. 9 is a flowchart showing an editing process of a first modification of the invention; and
Fig. 10 is a flowchart showing an editing process of a second modification of the invention.

[0041] Preferred embodiments of the invention will be described with reference to the drawings.

[0042] Embodiments of the invention relate to an information recording/reproducing apparatus as an information editing apparatus capable of editing recording information already recorded on a DVD-R as a write-once recording medium.

I. Embodiment of Recording Format

[0043] Before explaining the embodiment of the information recording/reproducing apparatus, a recording format of a DVD-R as a recording medium according to the embodiment will be described first by referring to Figs. 1 and 2.

[0044] Fig. 1 shows recording formats of recording information recorded on the DVD-R before and after executing an editing process of deleting a part of the recording information already recorded on the DVD-R only once. The left side of Fig. 1 shows the recording format before the editing process is executed, and the right side of Fig. 1 shows the recording format after the editing process is executed. Fig. 2 is a diagram showing a concrete example of an amount of information recorded as a border area which will be described later.

[0045] First, as shown in the left side of Fig. 1, after a recording process of recording information onto a DVD-R 1 is executed, a lead-in area LI, a file system area FS, a reproduction control information area NV, a backup area BP, a recording information area DT, a border-out area BO, and a empty area EP are formed on the DVD-R 1 in accordance with this order from the inner radius side.

[0046] In the lead-in area LI, start information as control information necessary to start reproducing the recording information recorded on the whole DVD-R 1 is recorded.

[0047] In the file system area FS, file system information indicative of a hierarchical structure of the reproduction control information recorded in the reproduction control information area NV is recorded.

[0048] In the reproduction control information area NV, the reproduction control information indicative of a reproduction mode of the recording information recorded in the recording information area DT is recorded.

[0049] In the backup area BP, as backup information used in the case where the reproduction control information recorded in the reproduction control information area NV cannot be read for some reason (such as a blemish on the DVD-R 1), the same reproduction control information is recorded.

[0050] In the recording information area DT, the recording information recorded on the DVD-R 1 by the recording process of once is stored.

[0051] In the border-out area BO, temporary end information necessary to temporarily finish the recording of the recording information is recorded. That is, by the information, the recording of the whole DVD-R 1 is not finished but the recording operation is temporarily finished in a state where the empty area EP is left.

[0052] The area on the DVD-R 1 other than the above-described areas is left as it is as a empty area EP in which no information is recorded.

[0053] The recording format of the information recorded on the DVD-R 1 after the editing process of (seemingly) deleting a part of the recording information recorded on the DVD-R 1 is stored as a first modification of the invention.

[0054] As shown in the right side of Fig. 1, after the deleting process is executed once, since the DVD-R 1 is of the write-once type, the start information in the lead-in area LI, file system information in the file system area FS, reproduction control information in the reproduction control information area NV, backup information in the backup area BP, and temporary end information in the border-out area BO remain the same without being changed.

[0055] Although there is no actual change in the recorded information in the recording information area DT, in new reproduction control information (that is, virtual reproduced recording information) is divided into, as shown on the right side of Fig. 1, first recording information stored in a first recording information area DT1, second recording information stored in a second recording information area DT2, and deletion information stored in a deletion information area NG (information which will not be reproduced after the deleting process).

[0056] In addition, after the deleting process, a border-in area BI, a file system area FS2, a reproduction control information area NV2, a backup area BP2, a border-out area BO2, and a empty area EP' are newly formed. A single border area BA is formed by the border-in area BI and the border-out area BO.
In the reproduction control information area NV2, out of the original recording information recorded in the recording information area DT, reproduction control information for preventing the deleted information stored in the deletion information area NG from being reproduced is recorded. In other words, the reproduction control information to make the information apparently deleted in the reproduction information after the deleting process is recorded.

In the border-in area BI, start information as control information necessary to start detecting reproduction control information in the reproduction control information area NV2 newly recorded is recorded.

In the file system area FS2, file system information indicative of a hierarchical structure or the like of new reproduction control information recorded in the reproduction control information area NV2 is recorded.

In the backup area BP2, in a manner similar to the backup area BP, as backup information used in the case where the reproduction control information recorded in the reproduction control information area NV2 cannot be read, the same reproduction control information is recorded.

In the border-out area BO2, in a manner similar to the border-out area BO, temporary end information necessary to temporarily finish the recording of the recording information after the deleting process is recorded.

The area on the DVD-R 1 other than the above-described areas is left as it is as a new empty area EP' in which no information is recorded.

As described above, in the DVD-R 1, it is necessary to re-record all the reproduction control information for controlling the reproduction mode of the whole recording information subjected to the deleting process including the reproduction control information for deleting a part or all of the original recording information before the deleting process. Consequently, even in the case of performing the deleting process in which no new information is recorded, the remaining capacity EP decreases gradually. The whole recording information denotes the first recording information stored in the first recording information area DT1, the second recording information stored in the second recording information area DT2, and the deletion information stored in the deletion information area NG.

The amount of the information recorded in each of the areas other than the recording information area DT is predetermined. Specifically, the amount of the start information in the border-in area BI is preset as 192 Kbytes (corresponding to 6 ECC (Error Correcting Code) blocks). The amount of each of the file system information in the file system information areas FS and FS2, the reproduction control information in each of the reproduction control information areas NV and NV2, and the backup information in each of the backup areas BP and BP2 is preset as about 512 Kbytes. As shown in Fig. 2, the amount of the information in the border area BA constructed by the border-in area BI and the border-out area BO is set in six ways in the range from about 6 Mbytes to about 96 Mbytes depending on the position in which the border area BA is formed on the DVD-R 1 and depending whether the border area is formed first or not. The formation position in Fig. 2 is shown by using the position on the DVD-R 1 expressed in hexadecimal notation. The ECC block in the display of an information amount denotes a block as an error correction unit in an error correcting process executed at the time of reproducing the recorded information.

II. Embodiment of Information Recording/Reproducing Apparatus

The configuration of the information recording/reproducing apparatus according to the embodiment in which a process of recording the information and a process of reproducing the recorded information are executed will be described by referring to Figs. 3 to 8.

Fig. 3 is a block diagram showing a schematic configuration of the information recording/reproducing apparatus. Each of Figs. 4 and 5 is a flowchart of the editing process of the embodiment. Each of Figs. 6A and 6B to 8A and 8B is a diagram showing an example of a setup screen or the like displayed in association with the editing process.

As shown in Fig. 3, an information recording/reproducing apparatus S according to the embodiment has a pickup 2, a modulator 3, a formatter 4, a video encoder 5, an audio encoder 6, a system controller 7 as a remaining capacity detecting device, a determining device, and a notifying device, a memory 9, a demodulator 10, a video decoder 11, an audio decoder 12, a servo IC (Integrated Circuit) 13, a spindle motor 14, an operation unit 15, a multiplexer 16, a demultiplexer 17, a menu screen generating circuit 18, and a switch 19.

The system controller 7 has a navigation information generator 8.

The schematic operation of each of the components will now be described.

First, an operation of recording video information or audio information input from the outside onto the DVD-R 1 loaded in the information recording/reproducing apparatus S will be described.

In the recording operation, the spindle motor 14 rotates the DVD-R 1 at preset rotational speed on the basis of a spindle control signal Sss sent from the servo IC 13.

Video information Sv as recording information to be recorded onto the DVD-R 1 is input from the outside and entered to the video encoder 5.

The video encoder 5 performs a preset encoding process, to be specific, for example, an MPEG (Moving Picture Experts Group) compression coding process on the video information Sv on the basis of a control signal Scv from the system controller 7 to thereby generate an encoded video signal Sev and outputs the encoded
video signal Sev to the multiplexer 11.

[0074] Audio information Sa as recording information to be recorded on the DVD-R 1 is input from the outside and then entered to the audio encoder 6.

[0075] The audio encoder 6 performs a preset encoding process, to be specific, for example, the MPEG compression coding process on the audio information Sa on the basis of a control signal Sca from the system controller 7 to thereby generate an encoded audio signal Sea, and outputs the encoded audio signal Sea to the multiplexer 11.

[0076] The multiplexer 11 multiplexes image information and sound information, which is included in the encoded video signal Sev, by a preset process to thereby generate a multiplex signal Smx and outputs the multiplex signal Smx to the formatter 4.

[0077] The multiplexer 11 allows the encoded audio signal Sea to pass and to be used as the multiplex signal Smx.

[0078] The formatter 4 combines a navigation information signal Snd (navigation information signal Snd including the reproduction control information) from the navigation information generator 8 which will be described later and the multiplex signal Smx on the basis of a control signal Scf from the system controller 7 to thereby generate a format signal Smt and outputs the format signal Smt to the modulator 3.

[0079] The recording information supplied as the multiplex signal Smx to the formatter 4 is output as a recording information signal Sfm to the system controller 7 at a preset timing so as to be used to generate the reproduction control information (hereinafter, also properly called navigation information) in the navigation information generator 8.

[0080] The modulator 3 performs a preset modulating process, for example, what is called 8-16 modulating process on the format signal Smt to thereby generate a modulation signal Sfe and outputs the modulation signal Sfe to the pickup 2.

[0081] The pickup 2 generates a light beam B of which intensity is modulated by the modulation signal Sfe, and an information track in an information recording face (not shown) of the DVD-R 1 is irradiated with the light beam B, thereby generating a pit, which corresponds to the navigation information and each of the recording information included in the modulation signal Sfe, on the information track, and recording the navigation information and the recording information in a physical format preset for the DVD-R onto the DVD-R 1. The navigation information includes backup information related to the navigation information, file system information, and temporary end information.

[0082] A deviation in the direction perpendicular to the information recording face and in the horizontal direction between a condensing position of the light beam B and the information track is solved by moving a not-illustrated objective lens (objective lens for condensing the light beam B) in the pickup 2 in the above-described perpendicular direction and horizontal direction on the basis of a pickup servo signal Ssp outputted from the servo IC 13. That is, focusing servo control and tracking servo control are executed.

[0083] The servo IC 13 generates the spindle control signal Sss and the pickup servo signal Ssp on the basis of a control signal Ssc from the system controller 7 and outputs the spindle control signal Sss and the pickup servo signal Ssp to the spindle motor 14 and the pickup 2, respectively.

[0084] When an operation for executing the recording process in the information recording/reproducing apparatus S is performed by the user, the operation unit 15 generates an operation signal Sin corresponding to the operation and outputs the signal to the system controller 7.

[0085] The navigation information generator 8 generates the navigation information signal Snd including the navigation information to be recorded on the DVD-R 1 under the control of the system controller 7 on the basis of the operation signal Sin and the recording information signal Sfm and outputs the navigation information signal Snd to one of the input terminals of the formatter 4.

[0086] The recording information in the multiplex signal Smx and the navigation information in the navigation information signal Snd are multiplexed by the formatter 4, and the format signal Smt including the recording information in the above-described physical format is generated.

[0087] The operation of reproducing the recording information and the like already recorded on the DVD-R 1 on the basis of the navigation information also recorded will now be described.

[0088] In the reproducing operation, the switch 19 is switched to the video decoder 11 side on the basis of a control signal Scsw from the system controller 19.

[0089] In the reproducing operation, first, the pickup 2 generates the light beam B for reproduction having a predetermined intensity, and the information track on which the pit is formed is irradiated with the light beam B. On the basis of reflection light of the light beam B, a detection signal Spp corresponding to the recording information and navigation information is generated, and outputted to the demodulator 10 and the system controller 7.

[0090] The demodulator 10 performs a demodulating process corresponding to the modulating process in the modulator 3 onto the detection signal Spp to thereby generate a demodulated signal Spd and outputs the demodulated signal Spd to the demultiplexer 17.

[0091] When the demodulate signal Spd includes video information, the demultiplexer 17 demultiplexes the video information into the image information and sound information included in the video information to thereby generate a demultiplex signal Sdmx, and outputs the demultiplex signal Sdmx to the video decoder 11.

[0092] When a demodulated signal Spd includes audio information, the demultiplexer 17 passes the demod-
ululated signal Spd as it is and outputs the signal to the audio decoder 12.

The video decoder 11 performs a decoding process corresponding to the encoding process by the video encoder 5 onto the demultiplex signal Sdmx on the basis of a control signal Sdv from the system controller 7 to generate a decoded video signal Sdv, and outputs the signal as a video output signal Sdout via the switch 19 to an external monitor (not shown) or the like.

The audio decoder 12 performs a decoding process corresponding to the encoding process in the audio encoder 6 onto the demodulated signal Spd including the audio information on the basis of a control signal Sda from the system controller 7 to generate a decoded audio signal Sda, and outputs the decoded audio signal Sda to an external amplifier (not shown) on the outside or the like.

The deviation in the direction perpendicular to the information recording face and the horizontal direction between the condensed position of the light beam B and the information track is solved by the focusing servo control and the tracking servo control based on the pickup servo signal Ssp output from the servo IC 13 in a manner similar to the recording process.

To reproduce the recording information in a reproduction mode indicated by the navigation information on the basis of the operation signal Sin corresponding to the operation for executing the reproducing process executed in the operation unit 15 and the navigation information included in the detection signal Spp, the system controller 7 generates the control signal Ssc so as to control the irradiation position on the DVD-R 1 of the light beam B for reproduction emitted from the pickup 2, outputs the control signal Ssc to the servo IC 13, generates the control signals Sdv and Sca, and outputs the control signals Ssc, Sdv, Sca to the video decoder 11 and the audio decoder 12, respectively.

Consequently, the recording information is reproduced in accordance with the reproduction order, reproduction time, or the like indicated by the navigation information.

An operation of executing the deleting process of deleting a part of the recording information already recorded on the DVD-R 1 will now be described.

In the case where the deleting process is executed, the switch 19 is switched to the menu screen generating circuit 18 side on the basis of the control signal Scsw from the system controller 7.

The menu screen generating circuit 18 generates a menu screen (setup screen) for setting deletion, which will be described later, by using the decoded video signal Sdv on the basis of a control signal Scmu from the system controller 7, and outputs the screen as a screen signal Smu to the not-illustrated monitor or the like via the switch 19.

After that, when the name of recording information to be deleted according to the menu screen, the deletion range, or the like is input from the operation unit 15, the navigation information generator 8 generates new navigation information having the contents for preventing a part of the recording information to be deleted from being reproduced in a reproducing process after that in correspondence with information input from the operation unit 15, generates the navigation information signal Snd including the navigation information, and records the new navigation information, backup information related to the navigation information, file system information, temporary end information, and the like in the empty area of the DVD-R 1 via the formatter 4, modulator 3, and pickup 2.

In parallel with the operations, while transmitting/receiving necessary information as a memory signal Sm to/from the memory 9, the system controller 7 generates the control signals Ssc, Sca, Scf, Ssc, Sdv, Scsw, Scmu, and Sca for controlling the operations and outputs the control signals to the corresponding component members.

The detailed operation of executing the editing process as the above-described deleting process will be described by referring to Fig. 1 and Figs. 4 to 8.

As shown in Fig. 4, in the editing process, first, the focusing servo control on the light beam B is turned on under the control of the servo IC 13 (step S1).

In a state where the focusing servo control is ON, on the basis of reflection light of the light beam B, whether a wobble occurs in an information track or not on the optical disk loaded in the information recording/reproducing apparatus S at present is detected (step S2).

Generally, the information track in a reproduction only DVD does not wobble. On the other hand, in a DVD-R (DVD-recordable) and DVD-RW (DVD-Read-Recordable; DVD on which information can be recorded plural times), the information track wobbles so that a clock signal as a reference at the time of recording is extracted or the like.

In determination of step S2, when no wobble on the information track is detected (step S2; NO), while executing phase difference method tracking servo control adapted to an information track which is not wobbling, the lead-in area of the loaded optical disk is irradiated with the light beam B (step S3). On the basis of the information obtained from the area, the type of the optical disk is determined. Specifically, whether the optical disk is the play-only DVD, DVD-R, or DVD-RW is determined (steps S4 and S5).

When it is determined in step S5 that the loaded optical disk is a play-only DVD, that is, either a DVD-ROM (DVD-Read Only Memory) on which data information for a computer or the like is recorded or a play-only DVD on which a movie or the like is recorded (step S5; YES), a flag indicating that the optical disk is a play-only DVD is set in the system controller 7 (step S6), the apparatus enters a standby mode.

On the other hand, when it is determined in step S5 that the loaded optical disk is not a play-only
generating circuit 18 and displayed on the monitor (not
An edit menu for the DVD-RW is generated by the menu
itable DVD except for the DVD-R 1, that is, the DVD-RW.
S21; NO), it is determined that the optical disk is an ed-
[0115] when present is the DVD-R 1 or not is determined by referring
information recording/reproducing apparatus S at
(step S20; YES), whether the optical disk loaded in the
process is finished. If the editing process is executed
editing process is not executed (step S20; NO), the
[0116] shows in Fig. 4 is executed and the apparatus enters
a standby mode.
[0110] When it is determined in step S2 that a wobble
is detected on the information track (step S2; YES),
while executing a push-pull tracking servo control adapt-
ed to the wobbling information track, the lead-in area of
the loaded optical disk is irradiated with the light beam
B (step S9), and the type of the optical disk is determined
on the basis of information obtained from the area (steps
S10 and S11).
[0121] The details of an actual editing process exe-
cuted after the type determining process or the like
shown in Fig. 4 is executed and the apparatus enters the
standby mode will be described by referring to Fig. 5.
[0115] In the editing process, first, whether an instruc-
tion of executing the editing process is executed in the
operation unit 15 or not is determined (step S20). If the
editing process is not executed (step S20; NO), the
process is finished. If the editing process is executed
(step S20; YES), whether the optical disk loaded in the
information recording/reproducing apparatus S at
present is the DVD-R 1 or not is determined by referring
to the flag in the system controller 7 (step S21).
[0116] When the optical disk is not the DVD-R 1 (step
S21; NO), it is determined that the optical disk is an ed-
itable DVD except for the DVD-R 1, that is, the DVD-RW.
An edit menu for the DVD-RW is generated by the menu
generating circuit 18 and displayed on the monitor (not
shown) or the like (step S32).
[0117] Fig. 6A shows an example of the edit menu
displayed on the monitor or the like. The edit menu M in-
cludes a title TT of the edit menu, a button B 1 to be
operated to change the name of the currently loaded
DVD-RW itself, a button B2 to be operated to edit each
recording information (hereinafter, the recording infor-
mation is called a title) recorded in the DVD-RW, a but-
ton B3 operated at the time of erasing all the titles re-
corded in the DVD-RW, an end button ED operated at
the time of finishing the editing process, and a decision
button CM operated to determine (execute) the operat-
ed process.
[0118] After the edit menu M is displayed, an actual
editing process using the edit menu M is executed (step
S33), and whether the operation of finishing the editing
process is executed by the operation unit 15 or not is
determined (step S34).
[0119] When the editing process is not finished (step
S34; NO), the processing of the embodiment returns to
step S33 and the editing process is continued. On the
other hand, when the operation of finishing the editing
process is performed (step S34; YES), a process of re-
writing the contents of the DVD-RW with the edited
recording information and the navigation information (in-
cluding corresponding file system information) corre-
sponding to the recording information is executed (step
S35), and the process is finished.
[0120] When it is determined in step S21 that the op-
tical disk loaded in the information recording/reproduc-
apparatus S is the DVD-R 1 (step S21; YES), the
amount of information in the current empty area (refer
to the reference characters EP in Fig. 1) in the DVD-R
1 is calculated on the basis of the file system information
recorded in the DVD-R 1 and the like (step S22) and,
further, whether the value of the calculated information
amount is equal to or larger than a preset minimum val-
ue or not is determined (step S23).
[0121] The minimum value in step S23 is equal to a
total value of new navigation information (512 Kbytes),
file system information (512 Kbytes), backup informa-
tion (512 Kbytes), temporary end information and start
information to be recorded in the border-in area BI (6 to
96 Mbytes as a total of the temporary end information
and the start information) generated by the editing pro-
cess of once and to be added. That is, the minimum value
is changing from about 7.5 Mbytes to about 97.5 Mbytes
depending on the formation position of the border area
BA and depending on whether the border area BA is
formed for the first time. When a empty area EP less
than the minimum value remains in the DVD-R 1, the
minimum value denotes an information amount of the
empty area in which the editing process cannot be per-
formed in the DVD-R 1.
[0122] When it is determined in step S23 that the in-
formation amount of the empty area EP is equal to or
larger than the minimum value (step S23; YES), the ed-
it process of once or more can be performed, so that
the specific number of times the editing process can be performed is calculated (step S25).

[0123] The number of times the editing process can be performed is calculated in step S25 by dividing the information amount of the empty area EP calculated in step S22 by the minimum value (about 7.5 Mbytes to 97.5 Mbytes) while considering the formation position of the border area BA.

[0124] After calculating the specific number of times the editing process can be performed, the edit menu for the DVD-R 1 including the calculated number of times the editing process can be performed is generated by the menu generating circuit 18 and displayed on the not-illustrated monitor or the like (step S26).

[0125] As the edit menu displayed on the monitor or the like, for example as shown in Fig. 6B, an edit menu MN including not only the configuration of the edit menu M shown in Fig. 6A but also the number of times CP the editing process can be performed indicative of the number of times the editing process can be performed calculated in step S25 is displayed.

[0126] After the edit menu MN is displayed, the editing process according to the edit menu MN is executed (step S27). By the editing process, the corresponding new start information, file system information, navigation information, backup information, and temporary end information are generated and temporarily stored in a not-illustrated memory in the system controller 7.

[0127] The concrete flow of the editing process in step S27 in the case where the button B2 is operated in the edit menu MN displayed in step S26 will be described as an example. First, a corresponding individual edit screen MD as shown in Fig. 7A is generated by the menu generating circuit 18 and displayed.

[0128] The individual edit screen MD includes a title TT, the number of times CP the editing process can be performed, representative image displays SM1 to SM6 (in the case where the total number of the titles is "6") displaying representative images (what is called thumbnail images) each having the title recorded in the DVD-R 1 at present, selection number indication NB in which the number of the selected title is displayed, the end button ED operated to finish the title selection, and the decision button CM operated to finally determine the title selection.

[0129] For example, when the title 1 is selected on the individual edit screen MD (refer to Fig. 7A), an edit menu MM indicative of the contents of the individual editing process is generated by the menu generating circuit 18 and displayed.

[0130] In this case, as shown in Fig. 7B, the edit menu MM includes the title TT, the number of times CP the editing process can be performed, a button B4 operated to disable a future editing process of the selected title, a button B5 operated to change the name of the selected title, a button B6 operated to delete (erase) the selected title from the DVD-R 1 (that is, to disable reproduction), a button B7 operated to delete a part in the selected title (in the case shown in Fig. 7B, a portion from the point A (start point) to the point B (end point) in the selected title), the end button ED operated to finish the editing process, and the decision button CM operated to finally determine the contents of the editing process.

[0131] The decision button CM in the edit menu MM is operated to determine whether the editing process is finished or not (step S28). When the decision button CM is not operated (step S28; NO), the editing process is continuously executed. Consequently, the processing of the embodiment returns to the step S26. On the other hand, when the decision button CM is operated (step S28; YES), to confirm whether the editing process is finally executed or not (in other words, whether new navigation information or the like is generated and additionally recorded on the DVD-R 1 or not), an editing process execution confirmation screen MR as shown in Fig. 8A is generated by the menu generating circuit 18 and displayed (step S29).

[0132] The execution confirmation screen MR includes the title TT, confirmation indication W for confirming deletion of the selected title and indicating the number of times the editing process can be performed after that, a representative image display SM for displaying a representative image of the title to be deleted, a cancellation button CL operated to cancel the editing process, and a confirmation button CO operated to execute the editing process.

[0133] When the execution confirmation screen MR is displayed, whether the confirmation button CO in the execution confirmation screen MR is operated or not is determined (step S30). When the confirmation button CO is not operated (step S30; NO), the processing of the embodiment returns to step S26 to execute the editing process again. On the other hand, when the confirmation button CO is operated (step S30; YES), to execute the editing process, the start information in the border-in area BI, file system information, navigation information, backup information, and temporary end information which are generated and stored in step S27 as a result of the editing process is read and recorded to the empty area. For example, as shown in the right side of Fig. 1, the border-in area BI, file system area FS2, reproduction control information area NV2, backup area BP2, and border-out area BO2 are generated (step S31), and the series of editing processes is finished.

[0134] When it is determined in step S23 that the information amount of the empty area EP is less than the minimum value (step S23; NO), the editing process cannot be performed even once. Consequently, a warning screen MW as shown in Fig. 8B is generated by the menu generating circuit 18 and displayed on the not-illustrated monitor or the like (step S24), and the process is finished.

[0135] The warning screen MW includes the title TT, warning indication WN indicating that the editing process cannot be performed due to an insufficient information amount in the empty area EP, and a confirmation...
adapted to the DVD-RW is executed (step S35), and the DVD-RW (step S21; NO), a rewrite editing process producing apparatus S is determined (step S21).

As described above, according to the editing process in the information recording/reproducing apparatus S of the embodiment, whether the editing process can be performed on the information recorded on the DVD-R 1 or not is displayed. Thus, the user can recognize the state before actually executing the editing process.

As the number of times the editing process can be performed on the recording information is determined and the determined number is displayed, the user can recognize the specific number of times the editing process can be performed before actually executing the editing process.

Further, since the editing process is to delete all or a part of the information recorded on the DVD-R 1, prior to execution of deleting a part or all of the recorded information, whether the information can be deleted or not can be recognized.

III. Modifications of Information Recording/Reproducing Apparatus

Modifications according to the invention will now be described by referring to Figs. 9 and 10.

Each of Figs. 9 and 10 is a flowchart showing the editing process of each of modifications. The same processes as those in the flowchart showing the editing process of the embodiment shown in Fig. 5 are designated by the same step numbers and the details will not be described.

First, the first modification will be described by referring to Fig. 9.

In the foregoing embodiment, the number of editing processes which can be performed after that is displayed to allow the user to confirm it (refer to step S25 in Fig. 5) and, after that, the actual editing process is executed (steps S26 to S31 in Fig. 5). Alternately, it is also possible to execute the editing process first and display the number of editing processes which can be performed immediately before recording new navigation information or the like to the DVD-R 1.

Specifically, as shown in Fig. 9, as the editing process of the first modification, first, the editing process is started (step S20; YES). The actual editing process using a not-illustrated memory in the system controller 7 is performed first (steps S26 to S28), and the type of the optical disk loaded in the information recording/reproducing apparatus S is determined (step S21).

When the type of the optical disk is the DVD-RW (step S21; NO), a rewrite editing process adapted to the DVD-RW is executed (step S35), and the process is finished.

When the optical disk is the DVD-R 1 (step S21; YES), the information amount of the empty area EP is calculated (step S22) and is compared with the minimum value (step S23).

The information amount of the empty area EP is less than the minimum value (step S23; NO), the warning screen MW (refer to Fig. 8B) is displayed (step S24), and the process is finished.

When the number of times the editing processes can be performed is calculated (step S25), and the execution confirmation screen MR (refer to Fig. 8A) is displayed (step S29). If the execution is confirmed (step S30; YES), the new navigation information or the like is recorded on the DVD-R 1 (step S31), and the process is finished.

By the editing process of the first modification as well, an effect similar to that of the foregoing embodiment can be produced.

A second modification will now be described by referring to Fig. 10.

The second modification described hereinafter is similar to the first modification with respect to the point that the editing process is executed first, and the number of times the editing process can be performed is displayed before the new navigation information or the like is recorded on the DVD-R 1 but is different from the first modification that the information amount is not compared with the minimum value.

As shown in Fig. 10, the editing process of the second modification is performed as follows. First, the editing process is started (step S20; YES), the actual editing process using the not-illustrated memory of the system controller 7 is performed first (steps S26 to S28), and the type of the optical disk loaded in the information recording/reproducing apparatus S is determined (step S21).

When the type of the optical disk is the DVD-RW (step S21; NO), a rewrite editing process adapted to the DVD-RW is executed (step S35), and the process is finished.

When the optical disk is the DVD-R 1 (step S21; YES), the information amount of the empty area EP is calculated (step S22), the actual number of times the editing process can be performed is calculated on the basis of the calculated information amount (step S25), and whether the number of times is equal to "0" or not is determined (step S40).

When the number of times is "0" (step S40; YES), the warning screen MW (refer to Fig. 8B) is displayed (step S24), and the process is finished.

When the number of times is not "0" (step S40; NO), the execution confirmation screen MR (refer to Fig. 8A) is displayed (step S29). When the execution is confirmed (step S30; YES), the new navigation information or the like is recorded on the DVD-R 1 (step S31), and
the process is finished.

[0157] With respect to the execution confirmation screen MR displayed in step S29, the number of times the editing process can be performed calculated as shown in Fig. 8A (refer to step S25) may be displayed or may not be displayed.

[0158] In the editing process according to the second modification, an effect similar to the foregoing embodiment can be produced. In addition, not only the number of times the editing process can be performed but also whether the process of editing the recorded information can be performed or not can be determined and the result of determination is notified. Thus, before the execution of the actual editing process, the user can recognize whether the editing process can be performed or not.

[0159] In the foregoing embodiment and modifications, the message that the editing process cannot be performed is notified by displaying the warning screen MW on the not-illustrated monitor or the like. It is also possible to notify the message by, for example, sound.

[0160] In the foregoing embodiment and modifications, the case where the editing process is executed on information recorded on the DVD-R 1 has been described. The invention can be also applied to a process of deleting information recorded on a CD-R (CD-Recordable) as another write-once recording medium.

[0161] Further, in the foregoing embodiment and modifications, at the time of executing the editing process, all of the file system information, navigation information, and backup information (all the information including changed information and information which does not have to be changed) is additionally recorded. It is also possible to additionally record only a changed portion when the information is compared with the file system information, navigation information, and backup information before edit, as new file system information, navigation information, and backup information.

[0162] Further, it is also possible to record the program corresponding to the flowchart shown in Fig. 4, 5, 9, or 10 on an information recording medium such as a flexible disk or hard disk, and read and execute the recorded program by a personal computer or a general CPU. In such a manner, the personal computer or the general CPU can function as the system controller 7.

[0163] The invention may be embodied in other specific forms. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description.

Claims

1. An information editing apparatus (S) for editing information already recorded on a recording medium (1) on which information can be recorded only once, said apparatus comprising:

   a setting device (7, 15) for setting up contents of an editing process for editing said recorded information such that control information (FS, NV, BP) relating to said recorded information is altered and rerecorded;

   a remaining capacity detecting device (7) for detecting a remaining capacity of an unrecorded area on said recording medium (1); and

   a menu generating circuit (18) being adapted to provide for a warning signal (MW) in case that the remaining recording capacity is insufficient to rerecord altered control information (FS2, NV2, BP2), characterized in that

   the apparatus further comprises a calculating device (7) for calculating a quantity indicating how often said recorded information can be edited on the basis of said detected remaining capacity and an amount of said control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area; and

   a menu generating circuit (18) being adapted to provide for an execution confirmation signal (MR) when said remaining recording capacity is sufficient to rerecord altered control information (FS2, NV2, BP2), said execution confirmation signal (MR) confirming the contents of said editing process and displaying said quantity indicating how often said recorded information can be edited.

2. The information editing apparatus (S) according to claim 1, wherein the editing process effects deletion of all or a part of said information already recorded on said recording medium.

3. The information editing apparatus (S) according to claim 2, wherein said altered control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area includes reproduction control information (NV2) for preventing said deleted information from being reproduced.

4. An information editing method for editing information already recorded on a recording medium on which information can be recorded only once, said method comprising:

   a setting process (S26, S27, S28) setting up contents of an editing process for editing said recorded information such that control information (FS, NV, BP) relating to said recorded information is altered and rerecorded;

   a remaining capacity detecting process (S22) detecting a remaining capacity of an unrecorded area on said recording medium; and

   a setting device (7, 15) for setting up contents of an editing process for editing said recorded information such that control information (FS, NV, BP) relating to said recorded information is altered and rerecorded;
a warning process (S24) providing for a warning signal (MW) in case that the remaining recording capacity is insufficient to rerecord altered control information (FS2, NV2, BP2).

characterized in that the method further comprises:

a calculating process (S25) calculating a quantity indicating how often said recorded information can be edited on the basis of said detected remaining capacity and an amount of said control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area; and

a notifying process (S29) providing for an execution confirmation signal (MR) when said remaining recording capacity is sufficient to rerecord altered control information (FS2, NV2, BP2), said execution confirmation signal (MR) confirming the contents of said editing process and displaying said quantity indicating how often said recorded information can be edited.

5. The information editing method according to claim 4, wherein the editing process effects deletion of all or a part of said information already recorded on said recording medium.

6. The information editing method according to claim 5, wherein said altered control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area includes reproduction control information (NV2) for preventing said deleted information from being reproduced.

7. An information recording medium on which a program for controlling an edit operation is recorded so as to be read by an editing computer included in an information editing apparatus (S) for editing information already recorded on a recording medium on which information can be recorded only once, said program causing said editing computer to function as:

a setting device (7, 15) for setting up contents of an editing process for editing said recorded information such that control information (FS, NV, BP) relating to said recorded information is altered and rerecorded;

a remaining capacity detecting device (7) for detecting a remaining capacity of an unrecorded area on said recording medium (1); and

a menu generating circuit (18) being adapted to provide for a warning signal (MW) in case that the remaining recording capacity is insufficient to rerecord altered control information (FS2, NV2, BP2),

characterized in that said program further causes said editing computer to function as a calculating device (7) for calculating a quantity indicating how often said recorded information can be edited on the basis of said detected remaining capacity and an amount of said control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area; and said menu generating circuit (18) being further adapted to provide for an execution confirmation signal (MR) when said remaining recording capacity is sufficient to rerecord altered control information (FS2, NV2, BP2), said execution confirmation signal (MR) confirming the contents of said editing process and displaying said quantity indicating how often said recorded information can be edited.

8. The information recording medium according to claim 7, wherein the editing process effects deletion of all or a part of said information already recorded on said recording medium.

9. The information recording medium according to claim 8, wherein said altered control information (FS2, NV2, BP2) to be rerecorded in said unrecorded area includes reproduction control information (NV2) for preventing said deleted information from being reproduced.

Patentansprüche

1. Informationsbearbeitungsvorrichtung (S) zum Bearbeiten von bereits auf einem Aufzeichnungsmedium (1) gespeicherter Information, auf dem Information nur einmal aufgezeichnet werden kann, womit die Vorrichtung umfasst:

- eine Einstellvorrichtung (7, 15) zum Aufstellen von Inhalten eines Bearbeitungsvorgangs zum Bearbeiten der aufgezeichneten Information auf eine solche Weise, dass Steuerinformation (FS, NV, BP), die sich auf die aufgezeichnete Information bezieht, geändert und erneut aufgezeichnet wird;

- eine Erfassungsvorrichtung für eine verbleibende Kapazität (7) zum Erfassen einer verbleibenden Kapazität eines nicht beschriebenen Bereichs auf dem Aufzeichnungsmedium (1); und

- eine Menüerzeugungsschaltung (18), die dazu angepasst ist, ein Warnsignal (MW) zur Verfügung zu stellen in dem Fall, dass die verblei-
bende Aufzeichnungskapazität nicht ausreicht, um die geänderte Steuerinformation (FS2, NV2, BP2) erneut aufzuzeichnen,

dadurch gekennzeichnet, dass
die Vorrichtung weiter eine Berechnungseinrichtung (7) aufweißt, um eine Maßzahl, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann, zu berechnen auf der Grundlage der erfassten verbleibenden Kapazität und einer Menge der Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll; und
die Menüerzeugungsschaltung (18) des Weiteren dazu angepasst ist ein Ausführungs-Bestätigungs- signal (MR) zur Verfügung zu stellen wenn die verbleibende Aufzeichnungskapazität ausreicht, um geänderte Steuerinformation (FS2,NV2,BP2) erneut aufzuzeichnen, wobei das Ausführungs-Bestätigungs- signal (MR) die Inhalte des Bearbeitungsvorgangs bestätigt und die Maßzahl anzeigt, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann.

2. Die Informationsbearbeitungsvorrichtung (S) nach Anspruch 1, wobei der Bearbeitungsvorgang Löschen der gesamten oder eines Teils der bereits auf dem Aufzeichnungsmedium aufgezeichneten Information bewirkt.

3. Die Informationsbearbeitungsvorrichtung (S) nach Anspruch 2, wobei die geänderte Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll, Wiedergabesteuerinformation (NV2) enthält um zu verhindern, dass die gelöschte Information wiedergegeben wird.

4. Informationsbearbeitungsverfahren zum Bearbeiten von bereits auf einem Aufzeichnungsmedium gespeicherter Information, auf dem Information nur einmal aufgezeichnet werden kann, wobei das Verfahren umfasst:
einen Einstellvorgang (S26, S27, S28) zum Aufstellen von Inhalten eines Bearbeitungsvorgangs zum Bearbeiten der aufgezeichneten Information auf eine solche Weise, dass Steuerinformation (FS, NV, BP), die sich auf die aufgezeichnete Information bezieht, geändert und erneut aufgezeichnet wird;
einen Erfassungsvorgang für eine verbleibende Kapazität (S22) zum Erfassen einer verbleibenden Kapazität eines nicht beschriebenen Bereichs auf dem Aufzeichnungsmedium; und

eine Warnvorgang (S24), der ein Warnsignal (MW) in dem Fall zur Verfügung stellt, dass die verbleibende Aufzeichnungskapazität nicht ausreicht, um die geänderte Steuerinformation (FS2, NV2, BP2) erneut aufzuzeichnen,

dadurch gekennzeichnet, dass
das Verfahren des Weiteren umfasst:
einen Berechnungsvorgang (S25), der eine Maßzahl, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann, berechnet auf der Grundlage der erfassten verbleibenden Kapazität und einer Menge der Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll; und
ein Benachrichtigungsvorgang (S29), um ein Ausführungs-Bestätigungs- signal (MR) zur Verfügung zu stellen wenn die verbleibende Aufzeichnungskapazität ausreicht, um geänderte Steuerinformation (FS2, NV2, BP2) erneut aufzuzeichnen, wobei das Ausführungs-Bestätigungs- signal (MR) die Inhalte des Bearbeitungsvorgangs bestätigt und die Maßzahl anzeigt, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann.

5. Das Informationsbearbeitungsverfahren nach Anspruch 4, wobei der Bearbeitungsvorgang Löschen der gesamten oder eines Teils der bereits auf dem Aufzeichnungsmedium aufgezeichneten Informationen bewirkt.

6. Das Informationsbearbeitungsverfahren nach Anspruch 5, wobei die geänderte Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll, Wiedergabesteuerinformation (NV2) enthält um zu verhindern, dass die gelöschte Information wiedergegeben wird.

7. Informationsaufzeichnungsmedium, auf dem ein Programm zum Steuern eines Bearbeitungsvorgangs aufgezeichnet ist, so dass es von einem in einer Informationsbearbeitungsvorrichtung (S) enthaltenen Bearbeitungskomputer gelesen wird, zum Bearbeiten von bereits auf einem Aufzeichnungsmedium gespeicherter Information, auf dem Information nur einmal aufgezeichnet werden kann, wobei das Programm den Bearbeitungskomputer dazu veranlasst zu arbeiten als:
eine Einstellvorrichtung (7, 15) zum Aufstellen von Inhalten eines Bearbeitungsvorgangs zum Bearbeiten der aufgezeichneten Information auf eine solche Weise, dass Steuerinformation (FS, NV, BP), die sich auf die aufgezeichnete
Information bezieht, geändert und erneut aufgezeichnet wird;

eine Erfassungsvorrichtung für eine verbleibende Kapazität (7) zum Erfassen einer verbleibenden Kapazität eines nicht beschriebenen Bereichs auf dem Aufzeichnungsmedium (1); und
die Menüerzeugungsschaltung (18), die dazu angepasst ist, ein Warnsignal (MW) zur Verfügung zu stellen in dem Fall, dass die verbleibende Aufzeichnungskapazität nicht ausreicht, um die geänderte Steuerinformation (FS2, NV2, BP2) erneut aufzuzeichnen,

dadurch gekennzeichnet, dass
das Programm den Bearbeitungscomputer des Weiteren dazu veranlasst als eine Berechnungseinrichtung (7) zu arbeiten, um eine Maßzahl, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann, zu berechnen auf der Grundlage der erfassten verbleibenden Kapazität und einer Menge der Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll; und
die Menüerzeugungsschaltung (18) des Weiteren dazu angepasst ist ein Ausführungs-Bestätigungs信号 (MR) zur Verfügung zu stellen wenn die verbleibende Aufzeichnungskapazität ausreicht, um geänderte Steuerinformation (FS2, NV2, BP2) erneut aufzuzeichnen, wobei das Ausführungs-Bestätigungs signal (MR) die Inhalte des Bearbeitungsvorgangs bestätigt und die Maßzahl anzeigt, die angibt wie oft die aufgezeichnete Information bearbeitet werden kann.

8. Das Informationsaufzeichnungsmedium nach Anspruch 7, wobei der Bearbeitungsvorgang Löschen der gesamten oder eines Teils der bereits auf dem Aufzeichnungsmedium aufgezeichneten Information bewirkt.

9. Das Informationsaufzeichnungsmedium nach Anspruch 8, wobei die geänderte Steuerinformation (FS2, NV2, BP2), die in dem nicht beschriebenen Bereich erneut aufgezeichnet werden soll, Wiedergabesteuerinformation (NV2) enthält um zu verhindern, dass die gelöschte Information wiedergegeben wird.

Revendications

1. Appareil de montage d'informations (S) pour monter des informations déjà enregistrées sur un support d'enregistrement (1) sur lequel des informations peuvent être enregistrées seulement une fois,

dudit appareil comprenant :

un dispositif de disposition (7, 15) pour dispenser des contenus d'un traitement de montage pour monter lesdites informations enregistrées pour que des informations de commande (FS, NV, BP) concernant lesdites informations enregistrées soient changées et réenregistrées ;
d'un dispositif de détection de capacité restante (7) pour détecter une capacité restante d'une zone non enregistrée sur dudit support d'enregistrement (1) ; et
un circuit de génération de menu (18) étant adapté pour fournir un signal d'avisement (MW) dans le cas où la capacité d'enregistrement restante est insuffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2),

caractérisé en ce que
l'appareil comprend en outre un dispositif de calcul (7) pour calculer une quantité indiquant comment souvent lesdites informations enregistrées peuvent être montées sur la base de ladite capacité restante détectée et une quantité desdites informations de commande (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée ; et
ledit circuit de génération de menu (18) étant en outre adapté pour fournir un signal de confirmation d'exécution (MR) lorsque ladite capacité d'enregistrement restante est suffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2), ledit signal de confirmation d'exécution (MR) confirmant les continus dudit traitement de montage et l'affichage de ladite quantité indiquant comment souvent lesdites informations enregistrées peuvent être montées.

2. Appareil de montage d'informations (S) selon la revendication 1, dans lequel le traitement de montage effectue l'affacement de tout ou d'une partie desdites informations déjà enregistrées sur ledit support d'enregistrement.

3. Appareil de montage d'informations (S) selon la revendication 2, dans lequel lesdites informations de commande changées (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée comprennent des informations de commande de reproduction (NV2) pour empêcher lesdites informations effacées d'être reproduites.

4. Procédé de montage d'informations pour monter des informations déjà enregistrées sur un support d'enregistrement sur lequel des informations peuvent être enregistrées seulement une fois, ledit procédé comprenant :
un traitement de disposition (S26, S27, S28) régissant des contenus d'un traitement de montage pour monter lesdites informations enregistrées pour que des informations de commande (FS, NV, BP) concernant lesdites informations enregistrées soient changées et réenregistrées ;

un traitement de détection de capacité restante (S22) détectant une capacité restante d'une zone non enregistrée sur ledit support d'enregistrement ; et

un traitement d'avertissement (S24) fournisant un signal d'avertissement (MW) dans le cas où la capacité d'enregistrement restante est insuffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2),

**caractérisé en ce que**

le procédé comprend en outre :

un traitement de calcul (S25) calculant une quantité indiquant comment souvent lesdites informations enregistrées peuvent être éditées sur la base de ladite capacité restante détectée et une quantité desdites informations de commande (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée ; et

un traitement de notification (S29) pourvoyant à un signal de confirmation d'exécution (MR) lorsque ladite capacité d'enregistrement restante est suffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2), ledit signal de confirmation d'exécution (MR) confirmant les contenus dudit traitement de montage et affichant ladite quantité indiquant combien souvent lesdites informations enregistrées peuvent être montées.

5. Procédé de montage d'informations selon la revendication 4, dans lequel le traitement de montage effectue l'effacement de tout ou d'une partie desdites informations déjà enregistrées sur ledit support d'enregistrement.

6. Procédé de montage d'informations selon la revendication 5, dans lequel lesdites informations de commande changées (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée comprennent des informations de commande de reproduction (NV2) pour empêcher lesdites informations effacées d'être reproduites.

7. Support d'enregistrement d'informations sur lequel un programme pour commander une opération de montage est enregistré afin d'être lu par un ordinateur de montage compris dans un appareil de montage (S) pour monter des informations déjà enregistrées sur un support d'enregistrement sur lequel des informations peuvent être enregistrées seulement une fois, ledit programme obligeant ledit ordinateur de montage à fonctionner comme :

un dispositif de disposition (7, 15) pour disposer des contenus d'un traitement de montage pour monter lesdites informations enregistrées pour que des informations de commande (FS, NV, BP) concernant lesdites informations enregistrées soient changées et réenregistrées ;

un dispositif de détection de capacité restante (7) pour détecter une capacité restante d'une zone non enregistrée sur ledit support d'enregistrement (1) ; et

un circuit de génération de menu (18) étant adapté pour fournir un signal d'avertissement (MW) dans le cas où la capacité d'enregistrement restante est insuffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2),

**caractérisé en ce que**

ledit programme en outre oblige lesdit ordinateur de montage à fonctionner comme un dispositif de calcul (7) pour calculer une quantité indiquant comment souvent lesdites informations enregistrées peuvent être montées sur la base de ladite capacité restante détectée et une quantité desdites informations de commande (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée ; et

nedit circuit de génération de menu (18) étant en outre adapté pour pourvoir à un signal de confirmation d'exécution (MR) lorsque ladite capacité d'enregistrement restante est suffisante pour réenregistrer des informations de commande changées (FS2, NV2, BP2) ledit signal de confirmation d'exécution (MR) confirmant les contenus dudit traitement de montage et affichant ladite quantité indiquant comment souvent lesdites informations enregistrées peuvent être montées.

8. Support d'enregistrement d'informations selon la revendication 7, dans lequel le traitement de montage effectue l'effacement de tout ou d'une partie desdites informations déjà enregistrées sur ledit support d'enregistrement.

9. Support d'enregistrement d'informations selon la revendication 8, dans lequel lesdites informations de commande changées (FS2, NV2, BP2) à réenregistrer dans ladite zone non enregistrée comprennent des informations de commande de reproduction (NV2) pour empêcher lesdites informations effacées d'être reproduites.
<table>
<thead>
<tr>
<th>FORMATION POSITION OF BORDER AREA</th>
<th>CAPACITY OF FIRST BORDER AREA</th>
<th>CAPACITY OF ANOTHER BORDER AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D700h~ 9DAFFh</td>
<td>32 MBYTES (1024 ECC BLOCKS)</td>
<td>6 MBYTES (192 ECC BLOCKS)</td>
</tr>
<tr>
<td>9DB00h~ 134FFh</td>
<td>64 MBYTES (2048 ECC BLOCKS)</td>
<td>12 MBYTES (384 ECC BLOCKS)</td>
</tr>
<tr>
<td>134300h~</td>
<td>96 MBYTES (3072 ECC BLOCKS)</td>
<td>18 MBYTES (576 ECC BLOCKS)</td>
</tr>
</tbody>
</table>
FIG. 4

START

TURN ON FOCUSING SERVO

S1

S2

WOBBLE DETECTED?

YES

EXECUTE PHASE DIFFERENTIAL TRACKING SERVO

S3

NO

EXECUTE PUSH-PULL TRACKING SERVO

S9

S4

DETERMINE DISK TYPE

1

S5

ROM?

YES

S7

DISPLAY WARNING

NO

EJECT DISK

S6

SET ROM AS DISK TYPE

S8

END

S10

DETERMINE DISK TYPE

S11

R?

YES

S12

SET R AS DISK TYPE

NO

S13

RW?

YES

SET RW AS DISK TYPE

1

S14

NO
**FIG. 7A**

INDIVIDUAL EDIT

THE NUMBER OF REMAINING TIMES INFORMATION CAN BE EDITED: 32

- TITLE 1
- NB
- SM2
- MD
- SM3
- SM6
- SM5
- ED
- CM

**FIG. 7B**

EDIT MENU

THE NUMBER OF REMAINING TIMES INFORMATION CAN BE EDITED: 32

1. PROTECTION (LOCK)  B4
2. TRACK NAME CHANGE  B5
3. TITLE DELETE  B6
4. A-B DELETE  B7

- END
- OK
- ED
- CM
**FIG. 8A**

TITLE DELETE

TITLE 1 WILL BE DELETED.
THE NUMBER OF REMAINING TIMES
INFORMATION CAN BE EDITED IS 32
INCLUDING THIS TIME. OK?

**FIG. 8B**

EDIT MENU

WARNING: DUE TO INSUFFICIENT DISK
REMAINING CAPACITY,
EDIT CANNOT BE MADE.