APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. 
--- | --- | --- | --- | --- 
11/337,813 | 02/26/2013 | 8385728 | LT-0097 | 4287 
34610 | 7990 | 02/06/2013 
KED & ASSOCIATES, LLP 
P.O. Box 8638 
Reston, VA 20195 

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 1505 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Dong Chul Chung, Seoul, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.
PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-8475

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

34610 7590 10/26/2012
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

APPLICATION NO. 11/337,813
FILING DATE 01/24/2006
FIRST NAMED INVENTOR Dong Chul Chung
ATTORNEY DOCKET NO. LT-0097
CONFIRMATION NO. 4287

TITLE OF INVENTION: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

APPLN. TYPE SMALL ENTITY ISSUE FEE DUE PUBLICATION FEE DUE PREV. PAID ISSUE FEE TOTAL FEE(S) DUE DATE DUE

nonprovisional NO $1770 $300 $0 $2070 01/28/2013

EXAMINER HASAN, SYED Y 2484 386-350000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
   - Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
   - "Fee Address" indication (or "Fee Address" indication form PTO/SB/47, Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
   (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
   (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

   PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

   (A) NAME OF ASSIGNEE
   Humax Co., Ltd.
   Yongin-si, Korea

   (B) RESIDENCE (CITY AND STATE OR COUNTRY)

   Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☑ Corporation or other private group entity ☐ Government

4. a. The following fee(s) are submitted:
   ☑ Fee $1,770.00
   ☑ Publication Fee (No small entity discount permitted) $300.00
   ☑ Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
   ☑ A check is enclosed.
   ☑ Payment by credit card.

5. Change in Entity Status (from status indicated above)
   a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
   b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Carol L. Druzbick
Typted or printed name

Date January 25, 2013
Registration No. 40,287

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.
**Electronic Patent Application Fee Transmittal**

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**Title of Invention:**
APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

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<th>Dong Chul Chung</th>
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<td>Daniel Y.J. Kim/Deborah Kimberlin</td>
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Filed as Large Entity

**Utility under 35 USC 111(a) Filing Fees**

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### Electronic Acknowledgement Receipt

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<td>Dong Chul Chung</td>
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<td><strong>Customer Number:</strong></td>
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<td><strong>Filer:</strong></td>
<td>Daniel Y.J. Kim/Deborah Kimberlin</td>
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### Payment Information:

- **Submitted with Payment:** yes
- **Payment Type:** Credit Card
- **Payment was successfully received in RAM:** $2070
- **RAM confirmation Number:** 2363
- **Deposit Account:**
- **Authorized User:**

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<th><strong>Multi Part /zip</strong></th>
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
NOTICE OF ALLOWANCE AND FEE(S) DUE

34610 7590 10/26/2012
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EXAMINER
HASAN, SYED Y

ART UNIT PAPER NUMBER
2484

DATE MAILED: 10/26/2012

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.
11/337,813 01/24/2006 Dong Chul Chung LT-0097 4287

TITLE OF INVENTION: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

APPLN. TYPE SMALL ENTITY ISSUE FEE DUE PUBLICATION FEE DUE PREV. PAID ISSUE FEE TOTAL FEE(S) DUE DATE DUE
nonprovisional NO $1770 $300 $0 $2070 01/28/2013

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee’s responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)
PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail
Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax
(571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.
11/337,813 01/24/2006 Dong Chul Chung LT-0097 4287

TITLE OF INVENTION: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

APPLN. TYPE SMALL ENTITY ISSUE FEE DUE PUBLICATION FEE DUE REV. PAID ISSUE FEE TOTAL FEES DUE DATE DUE

nonprovisional NO $1770 $300 $0 $2070 01/28/2013

EXAMINER ART UNIT CLASS-SUBCLASS
HASAN, SYED Y 2484 386-350000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.303).
   - Change of correspondence address (or Change of Correspondence Address form PTOB/122) attached.
   - "Fee Address" indication (or "Fee Address" Indication form PTOB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
   - (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
   - (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

   PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

   (A) NAME OF ASSIGNEE
   (B) RESIDENCE: (CITY and STATE OR COUNTRY)

   Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:
   - Issue Fee
   - Publication Fee (No small entity discount permitted)
   - Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
   - A check is enclosed.
   - Payment by credit card. Form PTO-2038 is attached.
   - The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
   a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
   b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Date

Typed or printed name Registration No.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.
Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1117 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1117 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.
Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management policies and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
**Notice of Allowability**

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**The MAILING DATE of this communication appears on the cover sheet with the correspondence address**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 17 November 2011.

2. □ An election was made by the applicant in response to a restriction requirement set forth during the interview on ___.
   - the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1, 4, 6, 8 and 10 - 14 (renumbered 1 - 9).

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   - a) ☑ All  b) □ Some*  c) □ None of the:
     1. ☑ Certified copies of the priority documents have been received.
     2. ☑ Certified copies of the priority documents have been received in Application No. _____.
     3. □ Copies of the certified copies of the priority documents have been received in this national stage application from the
        International Bureau (PCT Rule 17.2(a)).
        * Certified copies not received: _____.

   Applicant has THREE MONTHS FROM THE “MAILING DATE” of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

   **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. □ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER’S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. □ CORRECTED DRAWINGS (as “replacement sheets”) must be submitted.
   (a) □ including changes required by the Notice of Draftperson’s Patent Drawing Review (PTO-948) attached
       1) □ hereto or 2) □ to Paper No./Mail Date _____.
   (b) □ including changes required by the attached Examiner’s Amendment / Comment or in the Office action of
       Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. □ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner’s comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

---

**Attachment(s)**

1. ☑ Notice of References Cited (PTO-892)


3. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 1/5/2012

4. ☑ Examiner’s Comment Regarding Requirement for Deposit of Biological Material

---


6. □ Interview Summary (PTO-413), Paper No./Mail Date _____.

7. □ Examiner’s Amendment/Comment

8. ☑ Examiner’s Statement of Reasons for Allowance

9. □ Other _____.

---

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484

---
DETAILED ACTION

Allowable Subject Matter

1. Claims 1, 4, 6, 8 and 10 – 14 (renumbered 1 – 9) are allowed.

2. The following is a statement of reasons for the indication of allowable subject matter:

   The present invention of claims 1, 4, 6, 8 and 10 – 14 is directed to a television broadcasting program and apparatus managing method, involving extracting information on programs between starting and ending time from electronic program guide information, and storing extracted information in file allocation table.

   Independent claim 1 identifies the unique distinct feature “if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program, wherein the position information in the memory, corresponding to the third broadcast program includes a start address of the third broadcast program.”

   The closet prior art, Yuen et al (US 5488409) discloses a method for searching a start position of a broadcast program (col 12, lines 44 – 51 and col 16, lines 39 – 55) comprising: recording a video signal that includes a first broadcast program and a second broadcast program, wherein the first broadcast program changes to the second broadcast program during recording of the video signal (col 3, lines 1 – 9 and fig 3, col 9, line 48 to col 10, line 24) automatically detecting the start of the second broadcast program during recording of the video signal (fig 7, col 16, lines 18 – 44), when or after the second broadcast program starts, storing in a memory position information corresponding to a start part of the second broadcast
program being recorded on the hard disk (fig 1, col 6, lines 1 – 50 and fig 3, col 9, line 48 to col 10, line 24); wherein: (a) the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information of the start part of the second broadcast program stored separately from position information including an address corresponding to a start part of the first broadcast program (fig 3, col 9, line 48 to col 10, line 24) (b) the start of the second broadcast program is automatically detected based on Electronic Program Guide (EPG) information or a change in at least one of audio or video corresponding to the video signals (fig 23, col 36, lines 11 – 44) searching the memory for the position information for the second broadcast program while the second broadcast program is being recorded on the hard disk (col 10, lines 11 – 24 and fig 3, col 9, line 48 to col 10, line 24) and reproducing the second broadcast program from the address which corresponds to the start part in the hard disk indicated by the searched position information (col 46, line 64 to col 47, line 23 and col 47, lines 30 – 45). Arishima et al (US 7433579) teaches searching and reproducing being performed before the recording operation of the video signal has ended (col 10, line 54 to col 11, line 2) and hard disk (col 7, lines 36 – 39). However the combination of Yuen et al and Arishima et al fails to anticipate or render the above mentioned underlined limitations obvious.

Hence claim 1 is allowed.

Since claims 4, 11 and 13 are dependent on claim 1, therefore they are allowed.

Independent claim 6 identifies the unique distinct feature “wherein, if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, the controller
deletes the position information including an address of the start part of the third broadcast program.”

Hence claim 6 is allowed.

Since claims 8, 10, 12 and 14 are dependent on claim 6, therefore they are allowed.

Therefore claims 1, 4, 6, 8 and 10 – 14 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed Y. Hasan whose telephone number is 571-270-1082. The examiner can normally be reached on 9/8/5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Thai Tran can be reached on 571-272-7382. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. Y. H./  
10/18/2012

/Thai Tran/  
Supervisory Patent Examiner, Art Unit 2484
# Notice of References Cited

**U.S. PATENT DOCUMENTS**

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**NON-PATENT DOCUMENTS**

Include as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages.

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| V               |              |         |               |                |
| W               |              |         |               |                |
| X               |              |         |               |                |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.
# LIST OF ART CITED BY APPLICANT

**(PTO-1449)**

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## OTHER ART (Including Author, Title, Date, Pertinent Pages, Publisher, Place of Publication, Etc.)


**EXAMINER** /Syed Hasan/  
**DATE CONSIDERED** 10/18/2012
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Dong Chul CHUNG

Confirmation No.: 4287
Group Art Unit: 2621
Examiner: Syed Y. HASAN

Serial No.: 11/337,813
Customer No.: 34610
Filed: January 24, 2006

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

INFORMATION DISCLOSURE STATEMENT

U.S. Patent and Trademark Office
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

Pursuant to 37 C.F.R. §1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO-1449. One copy of each non-U.S. reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the “References Cited” on any patent to issue therefrom.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the indicated date. Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This statement should not be construed as a representation that a search has been made, that information cited in the statement is considered to be and/or is material to patentability, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith. It is further understood that the Examiner will consider information that was cited or submitted to the U.S. Patent and Trademark Office in a prior application relied on under 35 U.S.C. §120. 1138 OG 37, 38 (May 19, 1992).

☒ 1. This Information Disclosure Statement is being filed (i) within three months of the U.S. filing date of a U.S. application other than a CPA continued prosecution application under §1.53(d) OR (ii) within three months of the date of entry of the national stage as set forth in §1.491 in an international application OR (iii) before the mailing date of a first Office Action on the merits OR (iv) before the mailing of a first Office Action after the filing of a Request for continued examination under §1.114. No certification or fee is required. 37 C.F.R. §1.97(b).

☐ 2. This Information Disclosure Statement is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office Action on the merits, but before the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application. 37 C.F.R. §1.97(c).

☐ a. I hereby state that each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application or from the U.S. Patent Office in a related U.S. application, not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(1). No fee is required.

☐ b. I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2).

☐ c. Please charge our Credit Card in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p) per the attached PTO 2038 form. Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information.
3. This Information Disclosure Statement is being filed after the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application, but on or before payment of the Issue Fee. Please charge our Credit Card in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p) per the attached PTO 2038 form. Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information. 37 C.F.R. §1.97(d).
   a. I hereby state that each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application or from the U.S. Patent Office in a related U.S. application, not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(1).
   b. I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2).

4. The references were cited in a corresponding foreign application. A copy of the European Search Report dated July 18, 2011 is attached for the Examiner's information.

5. To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiros
Registration No. 39,318

P.O. Box 8638
Reston, VA 20195
703 766-3777 DYM/SWN/kcf
Date: January 5, 2012
Please direct all correspondence to Customer Number 34610

/Syed Hasan/ 10/18/2012
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**EXAMINER**

**DATE CONSIDERED**
A recording and reproducing device, which records and reproduces information on and from a rewritable recording medium having absolute addresses and comprising an information recording area wherein information entered from external devices is recorded and a TOC area wherein additional information with respect to the information recorded in the information recording area is recorded, comprises: an optical head and an electromagnet for recording information in the information recording area, and for recording in the TOC area, the absolute addresses indicating at least the recording positions of information as additional information every time the information is recorded in the information recording area; a display section for graphically displaying the recorded and unrecorded ranges of the information recording area independently according to the absolute addresses recorded in the TOC area with respect to the recording positions of each piece of information; warning means for warning to show that a position has already been occupied by referring to the additional information recorded in the TOC area when it is instructed to record new information in the position of the information recording area where another information has already been recorded; first editing means for erasing the additional information from the TOC area with respect to any information the information recording area when the information is completely erased therefrom; and second editing means for detecting a remaining amount of any information when the information is partially erased from the information recording area, for recording in the TOC area absolute addresses indicating the recording positions of the remaining information part in the TOC area, after replacing the absolute addresses indicating the recording positions of its original information with those indicating the recording positions of the remaining information when the remaining amount is not less than a predetermined value, and for erasing the additional information of the partially erased information from the TOC area when the remaining amount of the partially erased information is less than the predetermined value. With the arrangement, even if the stored additional information is lost due to the cut-off of the power source, in the recording operation thereafter, the user can accurately recognize the recording conditions of the information recording area, and such trouble as to record another information overlapping with information already recorded is perfectly prevented, and further the user can recognize space domains easily and accurately.
RECORDING AND REPRODUCING DEVICE

FIELD OF THE INVENTION

The present invention relates to a recording and reproducing device for recording as well as reproducing various kinds of information on and from a rewritable recording medium which comprises absolute addresses.

BACKGROUND OF THE INVENTION

Conventionally, compact disks are widely used, wherein music information or other information is recorded as digital signals by the use of pits mechanically formed thereon. These compact disks are designed to be reproduced on their information by a disk device used only for reproducing.

On the compact disks, there are pieces of information successively recorded, and in reproducing the information, a successive reproduction, selective reproduction, or other forms of reproduction is performed while collating absolute addresses predetermined recorded on the disk with those recorded in the TOC (Table Of Contents) area of the disk for indicating recording position of each piece of information.

In the meantime, in the case where rewritable disks such as magneto-optical disks, which have been developed recently, are applied for recording music information or other information thereon, it is desirable to provide a disk recording and reproducing device which has an interchangeability between the rewritable disks and those conventional compact disks by making their reproducing methods common in the applications.

Therefore, likewise in the compact disk, it is proposed to install a TOC area in the rewritable disk in order to record absolute addresses indicating the recording start positions and recording end positions therein and to use the absolute addresses recorded in the TOC area in reproducing each piece of information.

More specifically, when the rewritable disk is placed in the disk recording and reproducing device, by reading the absolute addresses recorded in the TOC area and storing them in the buffer section of a microcomputer, an access to the leading part of desired information may be performed at once in reproduction, and in recording new information, the absolute addresses of the information indicating the recording start position and recording end position thereof are stored in the buffer section. Moreover, when the rewritable disk is removed from the disk recording and reproducing device, the contents of the buffer section are recorded in the TOC area for use in the next reproduction.

Furthermore, in the disk recording and reproducing device having the above arrangement for the rewritable disks, it is proposed to display the absolute addresses indicating the recording start position and recording end position of each information on a display part in order to confirm the recorded information.

However, in the disk recording and reproducing device with the above arrangement, if the memory in the buffer section should be lost due to the cut-off of the power source or other malfunctions during recording on the rewritable disk or reproducing therefrom, nonconformity might occur between the absolute addresses recorded in the TOC area and the actual recorded positions of the information, and thereafter it would be impossible for the user to accurately recognize the contents of an information recording area wherein information entered from external devices is recorded. As a result, inconvenience might be presented in that another information is mistakenly recorded overlapping with the position where necessary information has been recorded.

Moreover, in the rewritable disk, a plurality of information tends to remain on the disk in an unsuccessful state due to such operations wherein a part of information previously recorded has to be erased. In this case, when finding space domains to record new information in, since the user has to determine the position and length of the space domains according to the absolute addresses of the information previously recorded shown on the display part, the determination tends to be complicated, and consequently, if the user should make a mistake in determining the length or other factors of the space domains, he might erase the information previously recorded while recording the new information.

Furthermore, a research on an overwriting function for magneto-optical disks or the like for overwriting new information on the range previously recorded has been carried out; however, with the arrangement, if overwriting should be mistakenly performed on a range with necessary recorded information, the informa-
tion would be erased, and whereby a troublesome situation might be caused. Moreover, if a part of or all of the information previously recorded should be erased by overwriting or erasing operation, nonconformity would occur between the contents of the TOC area and the actual position of the recorded information, thereby causing a confusion in the next access to the information.

SUMMARY OF THE INVENTION

It is a general object of the present invention to provide a recording and reproducing device wherein when it is instructed to record new information on a position in the information recording area of a recording medium where a previous information has already been recorded, warning can be given to show that the position has already been occupied.

It is another object of the present invention to provide a recording and reproducing device capable of preventing the inconvenience that necessary information might be mistakenly erased by recording new information.

It is still another object of the present invention to provide a recording and reproducing device capable of eliminating nonconformity between the contents of a TOC area in a recording medium and the actual position of the recorded information in an information recording area therein.

It is a further object of the present invention to provide a recording and reproducing device capable of eliminating the trouble in evaluating the utility of remaining information parts in a recording medium for the user.

It is a still further object of the present invention to provide a recording and reproducing device wherein even if additional information recorded is lost due to the cut-off of the power source or other malfunctions, in the recording operation thereafter, the user is able to accurately recognize the recording conditions of an information recording area in a recording medium, and such trouble as to record another information overlapping with information already recorded is perfectly avoidable.

It is another object of the present invention to provide a recording and reproducing device wherein in recording new information on a recording medium, the user is able to recognize space domains of an information recording area easily and accurately.

In order to achieve the above objects, a recording and reproducing device of the Present invention, which records and reproduces information on and from a rewritable recording medium having absolute addresses and comprising an information recording area wherein information entered from external devices is recorded and a TOC area wherein additional information with respect to the information recorded in the information recording area is recorded, is characterized in comprising: recording means for recording information in the information recording area and for recording the absolute addresses indicating at least the recording positions of information in the TOC area as additional information every time the information is recorded in the information recording area; display means for graphically displaying the recorded ranges and unrecorded ranges of the information recording area independently according to the absolute addresses recorded in the TOC area indicating the recording positions of each piece of information; warning means for warning to show that a position has already been occupied by referring to the additional information recorded in the TOC area if it is instructed to record new information in the position of the information recording area where another information has already been recorded; first editing means for erasing the additional information in the TOC area with respect to any information within the information recording area when it is completely erased therefrom; and second editing means for detecting a remaining amount of any information when the information is partially erased from the information recording area, for recording in the TOC area absolute addresses indicating the recording positions of the remaining information part after replacing the absolute addresses indicating the recording positions of its original information with those indicating the recording positions of the remaining information part by judging the remaining information part as one piece of information when the remaining amount is not less than a predetermined value, and for erasing the additional information of the partially erased information from the TOC area when the remaining amount of the partially erased information is less than the predetermined value.

With the above arrangement, since warning is given when it is instructed to record new information in the position of the information recording area of the rewritable recording medium, where another information has already been recorded, by evaluating the utility of the information which has been recorded in the position, the user is able to stop recording in the position after he judges if it is of utility value, and to instruct to overwrite new information therein if he judges it is not. As a result, it is avoidable to have the
inconvenience that necessary information might be mistakenly erased by overwriting new information.

Moreover, in the case where information previously recorded in the information recording area of the rewritable recording medium is completely erased by overwriting or erasing operation, since additional information with respect to information within the TOC area of the recording medium is also erased by the first editing means, nonconformity between the contents of the TOC area and the actual contents of the information recording area is eliminated.

Furthermore, in the case where information within the information recording area of the rewritable recording medium is partially erased, judgement is given by the second editing means with respect to the utility value of the partially remaining information based on the remaining amount. When the remaining part of the information is comparatively long and is judged useful, the absolute addresses indicating the recording positions of the remaining part are replaced with the absolute addresses indicating the recording positions of its original information and then recorded in the TOC area. On the other hand, when the remaining part is short and is judged not useful, additional information with respect to the information is erased. Therefore, the arrangement permits the user to spare the trouble in evaluating the utility of the remaining information part one by one, and conformity between the contents of the TOC area and the contents of the information recording area is properly maintained.

Moreover, every time information is recorded in the information recording area of the rewritable recording medium, its additional information including at least the absolute addresses indicating the recording positions of the information is recorded in the TOC area, and therefore even if additional information stored in the buffer section of the recording and reproducing device has been lost due to the cut-off of the power source or other malfunctions, additional information corresponding to the newest recording conditions of the recorded information is always stored in the TOC area. Consequently, in the recording operation thereafter, the user is able to accurately recognize the recording conditions of the information recording area in the recording medium, and such trouble as to record another information overlapping with information already recorded is perfectly prevented.

Furthermore, since the using conditions of the information recording area are displayed on the display means according to the absolute addresses recorded in the TOC area, that is, the recorded range and unrecorded range thereof, are graphically displayed thereon, in recording new information on the recording medium, the user is able to recognize space domains easily and accurately.

For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figs. 1 to 6 show one embodiment of the present invention.

Figs. 1(a) and 1(b) are explanatory diagrams respectively showing examples of using conditions of information recording area graphically displayed.

Fig. 2 is a block diagram showing a disk recording and reproducing device.

Fig. 3 is an explanatory diagram showing the cases wherein new information is recorded under the various using conditions of information recording area.

Fig. 4 is a schematic plan view of a magneto-optical disk.

Fig. 5 is an enlarged partial plan view of the magneto-optical disk.

Fig. 6 is an explanatory diagram showing an example of the use of an information recording area.

**DETAILED DESCRIPTION OF THE EMBODIMENTS**

The following description will discuss one embodiment of the present invention referring to Figs. 1 to 6.

As shown in Fig. 2, a disk recording and reproducing device referred to as a recording and reproducing device of the present invention comprises a spindle motor 2 for supporting and rotating a magneto-optical disk 1 as a rewritable recording medium, an optical head 3 for applying a laser beam on the magneto-optical disk 1 and for performing the reproduction of information according to a reflecting light from the magneto-optical disk 1 and an electromagnet 4 for applying a magnetic field to the magneto-optical disk 1. The electromagnet 4 makes it possible to overwrite new information on an area where another information has already been recorded. Moreover, the optical head 3 as well as the electromagnet 4 functions as recording means.
The disk recording and reproducing device comprises a first input terminal 5 and a second input terminal 6. Through the first input terminal 5, is entered analog information from magnetic tapes etc. or digital information from compact disks etc. On the other hand, through the second input terminal 6, is entered digital information for use in computers or the like.

The analog information entered through the first input terminal 5 is converted into digital information by being sampled by the use of sampling frequency, 44.1 kHz for compact disks at a digital input section 7, and then is sent to an error correction circuit 10.

On the other hand, the digital information entered through the first input terminal 5 is sent to the error correction circuit 10, without any treatment, through the digital input section 7. Moreover, the digital information entered through the second input terminal 6 is sent to the error correction circuit 10 through a dual error correction circuit 8.

To the information, which has been given error correction processing, if necessary, at the error correction circuit 10, are added subcodes generated at a subcode generation circuit 11, and then is sent to an electromagnet driving circuit 13 after being given EFM processing at an EFM (Eight Fourteen Modulation) circuit 12.

The electromagnet 4 is driven by the electromagnet driving circuit 13 according to the information modulated at the EFM circuit 12, and at the same time, a laser beam is applied to the magneto-optical disk 1 by the optical head 3, thereby recording the information in an information recording area 1b (see Fig. 4) of the magneto-optical disk 1.

In the present embodiment, every time information is recorded in the information recording area 1b, its additional information including absolute addresses indicating the recording start position and recording end position of the information is recorded in a TOC area 1a (shown in hatching in Fig. 4 for convenience), immediately after it is stored in a buffer memory 15 for the TOC area which will be described later. In this case, the additional information stored in the buffer memory 15 is sent to the EFM circuit 12, where EFM processing is applied to the information, and then is recorded by the electromagnet 4 while applying laser beam by the optical head 3 in the same process as was aforementioned.

With the arrangement of the present invention, since its additional information is recorded in the TOC area 1a every time information is recorded in the information recording area 1b, even in the case where the contents of the buffer memory 15 have been lost during the recording or reproducing operation due to the cut-off of the power source or other malfunctions, the newest recorded contents of the information recording area 1b remain stored in the TOC area 1a. Accordingly, in the recording or reproducing operation thereafter, the user is able to accurately recognize the recording conditions of the information stored in the information recording area 1b. Therefore, such trouble as to erase the previously recorded information while recording new information is perfectly prevented.

As shown in Fig. 5, on the magneto-optical disk 1, there are predeterminedly formed guiding grooves 14 (shown in hatching for convenience) having a spiral form or a concentric circular form, extending to a circumference direction, and wobbling is given to the guiding grooves 14 in a radius direction of the disk. More specifically, FM (Frequency Modulation) processing, which modulates the frequency of a carrier wave having a constant amplitude by absolute address information, is applied to the absolute addresses of each part on the magneto-optical disk 1, and the guiding grooves 14 are wobbling having pitches formed in response to the modulated frequencies.

As shown in Fig. 2, the recording and reproducing device of the present invention comprises the buffer memory 15. As aforementioned, the buffer memory 15 is designed so that the contents of the TOC area 1a are read therefrom and are stored therein at the time when the magneto-optical disk 1 is placed in the disk recording and reproducing device.

By applying laser beam to the magneto-optical disk 1, the optical head 3 is designed to reproduce the information stored in the information recording area 1b, the additional information stored in the TOC area 1a and the absolute addresses expressed by the wobbling of the guiding grooves 14.

A waveform processing circuit 16 is connected to the optical head 3, and the waveform processing circuit 16 performs waveform processing required for applying to the information or additional information reproduced by the optical head 3.

To the information or additional information after the application of waveform processing, is applied EFM demodulation by an EFM demodulation circuit 17, wherein signals after the application of EFM processing are demodulated, and is performed necessary processing by a reproduced signal processing circuit 18. Then, the information recorded in the information recording area 1b is released as digital information, as it is, through a output section 20 and a first output terminal 21, or it is released from the first output terminal 21 after being converted into analog information at the output section 20, if necessary. Furthermore, if the information is for computers or the like, it is released as digital information through a
second output terminal 23 after necessary error correction is performed thereto at a dual error correction circuit 22.

On the other hand, the additional information, to which necessary processing has been applied at the reproduced signal processing circuit 18, is stored in the buffer memory 15 through a microcomputer 24, as was aforementioned.

To the absolute addresses, to which waveform processing has been applied at the waveform processing circuit 16, is applied FM demodulation at an FM demodulation circuit 25, where their frequencies are converted into amplitudes. Successively, address demodulation is performed at an address demodulation circuit 26, and whereby the values of the absolute addresses are obtained from the amplitudes. The values of the absolute addresses are, on the one hand, sent to the microcomputer 24 and are, on the other hand, sent to an address operational circuit 27.

The microcomputer 24 adjusts rotation speed of the spindle motor 2, and is designed to perform rotation control for the magneto-optical disk 1, for example, by CLV (Constant Linear Velocity) control in recording or reproducing information as its basic function. Moreover, in the magneto-optical disk 1, information recording is basically performed by using a sampling frequency for compact disks, 44.1 kHz. However, in recording or reproducing digital information formed of another sampling frequency different from that for compact disks, the microcomputer 24 changes rotation speed of the spindle motor 2 according to the sampling frequency, thereby controlling recording density of the information to be substantially constant regardless of the sampling frequency.

Further, in the case of changing the rotation speed of the spindle motor 2 to a different speed from that used for compact disks according to the sampling frequency of information to be recorded, the absolute addresses predetermined in the magneto-optical disk 1 does not conform to elapsed time since the standard starting time of the recording or reproduction. In that case, the absolute addresses are converted at the address operational circuit 27 according to the rotation speed of the magneto-optical disk 1, and the compensated absolute addresses are found, which conform to the elapsed time since the predetermined standard starting time of the recording or reproduction. Then, the compensated absolute addresses are sent to the microcomputer 24. According to the compensated absolute addresses, at a display and operation section 28 having a display section as display means, the elapsed time since the start of reproduction or other factors is displayed. Moreover, through the display and operation section 28, instructions for recording or reproducing or other instructions are performed by the user.

On the display and operation section 28, the using conditions of the information recording area 1b, that is, the recorded ranges and unrecorded ranges are separately displayed. Now it is assumed that four pieces of information, from first to fourth information 35 to 38, are unsuccessively recorded in the information recording area 1b, as shown in Fig. 6. In that case, the converted values of the absolute addresses by time with respect to the recording start position and recording end position of each information 35 to 38 are expressed as numerical values shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Information</td>
</tr>
<tr>
<td>2nd Information</td>
</tr>
<tr>
<td>3rd Information</td>
</tr>
<tr>
<td>4th Information</td>
</tr>
</tbody>
</table>

However, it is not easy for the user to recognize the space domains only by the use of the display showing the recorded ranges of the information recording area 1b by numerical values.

Therefore, with the arrangement of the present embodiment, the using conditions of the information recording area 1b are shown by a graphical display on the display and operation section 28.

In that case, for example, as shown in Fig. 1(a), the recorded ranges and unrecorded ranges of the information recording area 1b can be separately displayed using bars with different contrasts, colors or the like. In addition, in Fig. 1(a), recorded ranges lasting less than two minutes are counted as two.

Moreover, as shown in Fig. 1(b), a disc shaped display modelled after the magneto-optical disk 1 can be disposed on the display and operation section 28, and the recorded ranges and unrecorded ranges of the information recording area 1b can be displayed on the disc with different contrasts, colors or the like with each other. The recording conditions of the information recording area 1b shown in Fig. 1(b) are
different from those shown in Fig. 6.

As aforementioned, by displaying the recorded ranges and unrecorded ranges of the information recording area 1b graphically, the user is able to recognize the rewritable domains of the information recording area 1b easily. In addition, various ways of the graphic display are adoptable other than those aforementioned.

In the meantime, the microcomputer 24 functions as first and second editing means which edit contents of the TOC area 1a according to changes of the recording contents of the information recording area 1b when such operations as overwriting operation for new information or as erasing operation for the recorded information in the information recording area 1b are performed. Moreover, although it is not shown in the figures, the disk recording and reproducing device of the present invention comprises warning means which, upon being instructed to record new information, refers to the additional information in the TOC area 1a, and warns the fact that a position has already been occupied by the use of a voice. warning sound, predetermined display or other methods when the instruction is given to record the new information in the position of the information recording area 1b having information already recorded therein. Referring to Fig. 3, the following description will discuss editing processing for additional information stored in the TOC area 1a which is performed in response to recording information to the information recording area 1b.

Under the condition shown by (a) in Fig. 3, the information recording area 1b has not been used yet. Under the condition, any position of the information recording area 1b is available to record new information. Further, no additional information has been recorded in the TOC area 1a under the conditions.

In the condition shown by (a) in Fig. 3, for example, it is assumed that new information 30 is recorded in a range having absolute addresses between $T_S$ and $T_E$ in the information recording area 1b. Upon recording the new information 30, in the TOC area 1a, are recorded the absolute addresses $T_S$ indicating the recording start position of the new information 30 and $T_E$ indicating the recording end position thereof as its additional information. Moreover, if necessary, the sampling frequency and the like of the new information 30 are also recorded in the TOC area 1a as the additional information.

In the using conditions shown by (b) to (d) in Fig. 3, a first to a fourth information 31 to 34, a first to a fourth information 31' to 34', and a first to a fourth information 31'' to 34'', each of which has a length different from one another, are recorded in the information recording area 1b. Therefore, in the TOC area 1a, are recorded absolute addresses indicating at least the recording start position and recording end position of each information, 31 to 34, 31' to 34', 31'' to 34'' as its additional information, according to respective using conditions.

Next, in the using condition shown by (b) in Fig. 3, in the case where new information 30 having an absolute address $T_S$ as its recording start position is recorded in a similar fashion to (a) in Fig. 3, when a recording operation for the new information 30 is instructed by the user through the display and operation section 28, the microcomputer 24 refers to additional information being stored in the buffer memory 15. By the process, since it is recognized that the second information 32 has already been recorded in the recording start position where the new information 30 is instructed to be recorded, warning is given to show that the position has already been occupied, by the warning means according to the instruction from the microcomputer 24. More specifically, for example, since the recording start position of the new information 30 is included within the recording range of the second information 32, when the new information 30 is recorded with $T_S$ as its recording start position, the warning is given to show that the second information 32 is partially erased, and that the third information 33 is also erased since it exists just behind the second information 32.

According to the warning, the user decides whether or not he records the new information 30 with $T_S$ as its recording start position, and if he judges that the second information 32 and the third information 33 deserve to remain as information of utility value, he specifies another position without recordings of information again and starts recording the new information 30. In that case, the absolute addresses indicating the recording start position and recording end position and the like of the new information 30 are recorded in the TOC area 1a.

On the other hand, if the user judges that the second information 32 and the third information 33 does not deserve to remain since they have less utility value, he may instruct to record the new information 30 with $T_S$ as its recording start position. In that case, the second information 32 and the third information 33 are partially erased by the overwriting operation of the new information 30.

When the new information 30 is recorded in the range $T_S$ to $T_E$, at first, the absolute addresses $T_S$ and $T_E$ indicating the recording start position and recording end position of the new information 30 are recorded in the TOC area 1a. Then, by the microcomputer 24 as second editing means, it is judged whether each remaining amount of the second information 32 and third information 33, which are partially left over, is not less than a predetermined value, for example, in the case of music information, whether it is not less than
one minute when it is converted into performance time. In addition, the predetermined value is presettable by the user.

Hereupon, in the condition shown by (b) in Fig. 3, it is assumed that each of the second information 32 and third information 33 partially remains with a length not less than the predetermined value. In that case, the microcomputer 24 makes a decision that the additional information with respect to the second information 32 and third information 33 should be continuously kept in the TOC area 1a. With the decision, the microcomputer 24 instructs to rewrite the contents of the additional information in the TOC area 1a, and permits the absolute address indicating the recording end position of the second information 32 to change from the previous T$_S$ to T$_E$, and also permits the absolute address indicating the recording start position of the third information 33 to change from the previous T$_S$ to T$_E$.

Next, in the using condition of the information recording area 1b shown by (c) in Fig. 3, it is assumed that a recording operation for the new information 30 with T as its recording start position is instructed. Then, it is assumed that, in spite of warning to show that the position has already been occupied, the new information 30 is recorded with T$_S$ as its recording start position.

In that case, the absolute addresses indicating the recording start position and recording end position of the new information 30 are first recorded in the TOC area 1a. Next, by the function of the microcomputer 24 as first editing means, it is judged whether the third information 33' has been completely erased, and then the additional information with respect to the third information 33' is erased from the TOC area 1a.

Furthermore, by the function of the microcomputer 24 as the second editing means, it is judged whether the second information 32' and the fourth information 34' are partially erased, and then it is judged whether each of the remaining amount of the second information 32' and forth information 34' is not less than the predetermined amount. When each of the remaining amount of the second information 32' and fourth information 34' is not less than the predetermined value, as aforementioned, the contents of the TOC area 1a are rewritten, and the absolute address indicating the recording end position of the second information 32' is changed from T$_S$' to T$_E$ while the absolute address indicating the recording start position of the fourth information 34' is changed from T$_E$' to T$_E$.

Next, in the using condition shown by (d) in Fig. 3, the following discussion concentrates on the case where the new information 30 is recorded with T$_S$ as its recording start position as was aforementioned. Again in this case, the absolute addresses indicating the recording start position and recording end position of the new information 30 are first recorded in the TOC area 1a.

Then, by the function of the microcomputer 24 as the second editing means, it is judged whether the second information 32'' and third information 33'' are partially erased, and continuously judgement is made on the remaining amount of each of the second information 32'' and third information 33''. When the remaining amount of each of the second information 32'' and third information 33'' is less than a predetermined value, the microcomputer 24 judges that the remaining parts of the second information 32'' and third information 33'' are less important in their utility, and erases the additional information with respect to the second information 32'' and third information 33'' from the TOC area 1a.

In the above, the description discussed the editing processing with respect to the TOC area 1a in the case where previous information is erased by overwriting operation; however, the same editing processing is also performed in the case where any information is erased by an erasing operation.

As aforementioned, in the present embodiment, the editing processing with respect to additional information in the TOC area 1a is performed without any instruction by the user when previous information is completely or partially erased by overwriting operation, erasing operation or other operation, and even if the previous information remains partially, rewriting or erasing operation with respect to the additional information is performed according to the length of the remaining part.

Therefore, the arrangement permits the user to spare the trouble in performing the editing operation, and conformity between the contents of the TOC area 1a and the actual recorded contents of the information recording area 1b is always maintained.

In addition, in the arrangement of the above embodiment, absolute addresses are recorded in the magneto-optical disk 1 by giving wobbling to the guiding grooves 14; however, absolute addresses may be recorded by other methods such as those using pits mechanically formed.

Moreover, in the above embodiment, the explanation was given on the magneto-optical disk as a rewritable disk; however, the present invention is also applicable to rewritable disks such as optical disks of phase transition type, or to Direct Read After Write type disks or the like capable of recording information only once.

As aforementioned, a recording and reproducing device of the present invention comprising an information recording area and a TOC area, is used for recording and reproducing on and from a rewritable recording medium having absolute addresses, and further comprises: recording means for recording
information in the information recording area and for recording in the TOC area the absolute addresses indicating at least the recording position of the information as additional information every time the information is recorded in the information recording area; display means for graphically displaying the recorded ranges and unrecorded ranges of the information recording area independently according to the absolute addresses recorded in the TOC area with respect to the recording positions of each piece of information; warning means for warning to show that the position has already been occupied by referring to the additional information recorded in the TOC area when it is instructed to record new information in the position of the information recording area where another information has already been recorded; first editing means for erasing the additional information from the TOC area with respect to any information within the information recording area when the information is completely erased therefrom; and second editing means for detecting a remaining amount of any information when the information is partially erased within the information recording area, for recording the absolute addresses indicating the recording positions of the remaining information part in the TOC area, after replacing the absolute addresses indicating the recording positions of its original information with those indicating the recording positions of the remaining information part by judging the remaining information part as one piece of information when the remaining amount is not less than a predetermined value, and for erasing the additional information of the partially erased information from the TOC area when the remaining amount of the partially erased information is less than the predetermined value.

With the arrangement, every time information is recorded in the information recording area, its additional information including at least the absolute addresses indicating the recording positions of the information is recorded in the TOC area, and therefore even if additional information stored in the buffer section of the recording and reproducing device has been lost due to the cut-off of the power source or other malfunctions, the additional information corresponding to the newest recording conditions of recorded information is always stored in the TOC area. Consequently, in the recording operation thereafter, the user is able to accurately recognize the recording conditions of the information recording area, and such trouble as to record another information overlapping with information already recorded is perfectly prevented.

Furthermore, since the using conditions of the information recording area are displayed on the display means according to the absolute addresses recorded in the TOC area, that is, the recorded ranges and unrecorded ranges thereof are graphically displayed thereon, the user is able to recognize space domains easily and accurately in recording new information.

Moreover, since it is arranged that warning is given when it is instructed to record new information in the position of the information recording area where another information has already been recorded, by evaluating the utility of the information which has been recorded in the position, the user is able to stop recording in the position if he judges it is of utility value, and to instruct to overwrite new information therein if he judges it is not. As a result, it is avoidable to have the inconvenience that necessary information might be mistakenly erased by overwriting new information.

Moreover, in the case where information previously recorded in the information recording area is completely erased by overwriting or erasing operation, since additional information within the TOC area with respect to the information is also erased by the first editing means, nonconformity between the contents of the TOC area and the actual contents of the information recording area is eliminated.

Furthermore, in the case where information within the information recording area is partially erased by overwriting or other operation, judgement is given by the second editing means with respect to the utility value of the partially remaining information based on the remaining amount. When the remaining part is comparatively long and is judged useful, the absolute addresses indicating the recording positions of the remaining part are replaced with the absolute addresses indicating the recording positions of its original information and then recorded in the TOC area. On the other hand, when the remaining part is short and is judged not useful, the additional addresses of the information is erased. Therefore, the arrangement permits the user to spare the trouble in evaluating the utility of the remaining information part one by one, and conformity between the contents of the TOC area and the recorded contents of the information recording area is properly maintained.

The invention being thus described, it may be obvious that the same may be varies in many ways. Such variations are not to be regarded as a departure from the scope of the invention.

There are described above novel features which the skilled man will appreciate give rise to advantages. These are each independent aspects of the invention to be covered by the present application, irrespective of whether or not they are included within the scope of the following claims.

Claims
1. A recording and reproducing device, which records and reproduces information on and from a rewritable recording medium having absolute addresses and comprising an information recording area wherein information entered from external devices is recorded and a TOC area wherein additional information with respect to the information recorded in the information recording area is recorded, comprising:

recording means for recording information in the information recording area and for recording in the TOC area the absolute addresses indicating at least the recording positions of the information as additional information;

display means for graphically displaying the recorded and unrecorded ranges of the information recording area independently according to the absolute addresses recorded in the TOC area with respect to the recording positions of each piece of information;

warning means for warning to show that a position has already been occupied by referring to the additional information recorded in the TOC area when it is instructed to record new information in the position of the information recording area where another information has already been recorded;

first editing means for erasing the additional information in the TOC area with respect to any information within the information recording area when it is completely erased therefrom; and

second editing means for detecting a remaining amount of any information when the information is partially erased from the information recording area, for recording in the TOC area the absolute addresses indicating the recording positions of the remaining information part after replacing the absolute addresses indicating the recording positions of its original information with those indicating the recording positions of the remaining information part by judging the remaining information part as one piece of information, when the remaining amount is not less than a predetermined value, and for erasing the additional information of the partially erased information is less than the predetermined value.

2. A recording and reproducing device as set forth in claim 1, wherein said recording means records information in the information recording area, and records absolute addresses indicating at least the recording positions of the information in the TOC area as additional information every time the information is recorded in the information recording area.

3. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the absolute addresses are prerecorded in the form of wobbling guiding grooves on rewritable disk.

4. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the absolute addresses are recorded by the use of pits or grooves which are mechanically formed.

5. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the rewritable recording medium includes optical cards and magnetic tapes.

6. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the rewritable recording medium includes magneto-optical disk which performs recording and erasing by utilizing magneto-optical effect.

7. A recording and reproducing device as set forth in claim 6, wherein the recording means includes an optical head for applying a light beam to the magneto-optical disk and an electromagnet for applying external magnetic fields to the magneto-optical disk in response to recording signals.

8. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the rewritable recording medium includes rewritable disks which perform recording and erasing by utilizing phase transition.

9. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the rewritable recording medium includes Direct Read After Write type disks capable of recording information only once.

10. A recording and reproducing device as set forth in claim 8 or claim 9, wherein the recording means includes an optical head for applying a laser beam to the disk so as to record and reproduce information.

11. A recording and reproducing device as set forth in claim 1 or claim 2, the display means includes a display section for graphically displaying the recorded ranges and unrecorded ranges of the information recording area separately by using bars with different contrasts, colors or the like.

12. A recording and reproducing device as set forth in claim 6, claim 8 or claim 9, wherein the display means includes a display section, comprising a disc shaped display modelled after the disk, for graphically displaying the recorded ranges and unrecorded ranges of the information recording area separately in the disc with different contrasts, colors or the like each other.

13. A recording and reproducing device as set forth in claim 1 or claim 2, wherein the warning means is designed to give warning by a voice, warning sound, predetermined display or other methods.

14. A recording method for information in a recording and reproducing device comprising the steps of:
recording information in an information recording area; and
recording additional information, comprising the absolute addresses indicating the recording start position and recording end position of the information, in a TOC area immediately after the additional information has been stored in a buffer memory for TOC.

15. An editing processing method for additional information in a TOC area of a recording and reproducing device, comprising the steps of:
erasing additional information from the TOC area with respect to information when the information recorded in an information recording area has been completely erased;
detecting remaining amount of the information partially left over when information recorded in the information recording area is partially erased;
recording absolute addresses indicating the recording positions of a remaining information part in the TOC area after replacing the absolute addresses indicating the recording positions of its original information with those indicating the recording positions of the remaining information part when the remaining amount is not less than a predetermined value; and
erasing additional information of the information from the TOC area when the remaining amount of the information is less than the predetermined value.

16. Apparatus for recording and reproducing on and from a rewritable recording medium having an information recording area for the information itself and an address data recording area for address data identifying the portion or portions of the information recording area occupied by such information, the apparatus including warning means for providing a user-sensible warning when a position selected for the recording of new information in said information recording area is already occupied.

17. Apparatus for recording and reproducing on and from a rewritable recording medium having an information recording area for the information itself and an address data recording area for address data identifying the portion or portions of the information recording area occupied by such information, the apparatus including graphic display means which includes a visual representation of the total time capacity of the information recording area, and which displays on said visual representation the recorded and unrecorded portions of said information recording area.

18. Apparatus for recording and reproducing on and from a rewritable recording medium having an information recording area for the information itself and an address data recording area for address data identifying the portion or portions of the information recording area occupied by such information, the apparatus including editing means operable so that if a remaining part of an existing recorded information which is partly erased by the recording of new information, is smaller than a predetermined amount, the address data relating to said existing recorded information is erased from said address data recording area whereas if it is equal to or greater than said predetermined amount, said address data is revised so as to identify said remaining part instead of the whole of said existing recorded information.
Disk recording and/or reproducing apparatus

At least address information that is necessary for access to an input data recording area of a disk-shaped recording medium is recorded in a nonvolatile memory.
Description

[0001] The present invention relates to a disk apparatus and can be applied to, for example, a removable hard disk apparatus for recording a video signal.

[0002] Conventionally, among apparatuses for recording a video signal, video tape recorders using a magnetic tape as a recording medium are widely used. In such video tape recorders, a video signal and an audio signal that are input in time series are helically recorded on a magnetic tape in units of the field or frame of the video signal.

[0003] In recent years, apparatuses for recording a video signal and an audio signal using an optical disc have been proposed. Such apparatuses using an optical disc can record a video signal and an audio signal of about 2 hours.

[0004] In contrast, personal computers record application programs etc. by using a hard disk drive. In recent years, hard disk drives have been miniaturized and increased in recording density at high speeds.

[0005] In such hard disk drives, the recording area of hard disks is divided into a system entry area and a data area. Various data that are input from external apparatuses are recorded in the data area and data that are necessary for access of the data area are recorded in the system entry area.

[0006] Therefore, in hard disk drives, the contents of the system entry area are updated upon completion of data recording in the data area. This makes it possible to access recorded data by searching the system entry area and to record desired data by detecting a free region by searching the system entry area.

[0007] Incidentally, it is considered that a compact recording apparatus capable of long-time recording of a video signal could be constructed by using a hard disk drive. In this case, it is conceivable to deal with, as files, a video signal and an audio signal to be recorded in the hard disk drive and to use, as it is, a file management system that is used in personal computers.

[0008] However, where a video signal etc. are recorded simply by using a file management system that is applied to personal computers etc., there are problems that the waiting time until access of the data area is long and that it is difficult to cope with an abnormal termination of recording.

[0009] Specifically, in hard disk drives, in recording or reproduction, it is necessary to access the system entry area in advance because the data area is accessed based on data recorded in the system entry area. Hard disk drives have a problem that a long waiting time is needed until the start of access to the data area because considerable time is required for magnetic head seeking and hard disk rotation waiting in accessing the system entry area.

[0010] As for the above problem, in applying a hard disk drive to a personal computer, adverse influences of such a long waiting time can be avoided by performing a data exchange in such a manner that the personal computer side is rendered in a standby state by means of an interface between the hard disk drive and the personal computer. However, in the case of dealing with a video signal, it is necessary to record or reproduce high-transfer-rate data on a real-time basis. If the waiting time is long, there may occur an event that continuous data cannot be recorded in a case where a hard disk drive is applied to a video-camera-incorporated recording apparatus, for example.

[0011] In hard disk drives, repeated recording and erasing operations cause continuous data to be recorded in discrete regions (divided regions), as a result of which a video signal may not be produced continuously in reproduction.

[0012] On the other hand, in applying a hard disk drive to, for example, a video-camera-incorporated recording apparatus, consideration should be given to the fact that the power may be shut off during recording due to a drop, running out of electricity of a battery, a sudden power shutoff by a user, or the like. In conventional hard disk drives, it is difficult to update the contents of the system entry area at the occurrence of such an abnormal termination; a video signal that has been recorded so far with much effort cannot be used anymore.

[0013] Accordingly, it is an aim of at least an embodiment of the invention to provide a disk apparatus which makes it possible to access a data area with a short waiting time and to use, as effective data, so far recorded data even at the occurrence of an abnormal termination.

[0014] A disk apparatus according to the invention comprises a nonvolatile memory in which at least address information that is necessary for access of an input data recording area of a disk-shaped recording medium is to be recorded, and memory control means for recording the address information in the nonvolatile memory.

[0015] According to the invention, since the disk apparatus comprises the nonvolatile memory in which at least address information that is necessary for access of an input data recording area of a disk-shaped recording medium is to be recorded and the memory control means for recording the address information in the nonvolatile memory, the disk-shaped recording medium can be accessed based on the address information that is recorded in the nonvolatile memory without the need for accessing the disk-shaped recording medium each time. This makes it possible to access the disk-shaped recording medium with a much shorter waiting time. Even at the occurrence of a power shutoff or the like, data that was recorded until the abnormal termination can be used based on the address information recorded in the nonvolatile memory because the address information is held in the nonvolatile memory even after such an incident.

[0016] The invention will now be described by way of example with reference to the accompanying drawings, throughout which like parts are referred to by like references, and in which:
Fig. 1 is a block diagram showing the entire configuration of a hard disk apparatus according to a first embodiment of the invention;

Fig. 2 shows recording areas of hard disks of the hard disk apparatus of Fig. 1;

Fig. 3 shows file management data that is recorded in a directory area shown in Fig. 2;

Fig. 4 shows codes that are recorded in an FAT area shown in Fig. 2;

Fig. 5 is a flowchart showing a process that is executed by a hard disk control circuit of the hard disk apparatus of Fig. 1 during recording;

Fig. 6 is a flowchart showing a process that is executed by the hard disk control circuit shown in Fig. 1 during reproduction;

Fig. 7 is a flowchart showing a process that is executed by the hard disk control circuit shown in Fig. 1 to cope with an abnormal termination;

Fig. 8 is a block diagram showing a hard disk apparatus according to a second embodiment of the invention;

Fig. 9 is a flowchart showing a process that is executed by a system control circuit of the hard disk apparatus of Fig. 8 during writing; and

Fig. 10 is a flowchart showing a process that is executed by the system control circuit of the hard disk apparatus of Fig. 8 at starting.

[0017] Embodiments of the present invention will be hereinafter described in detail with reference to the accompanying drawings.

(1) First Embodiment

(1-1) Configuration of first embodiment

[0018] Fig. 1 is a block diagram showing a hard disk apparatus according to a first embodiment of the invention. Attached to an imaging apparatus, a set-top box, or the like, the hard disk apparatus 1 records a video signal and an audio signal that are output from such an AV apparatus. Further, the hard disk apparatus 1 reproduces and outputs a recorded video signal and an audio signal in a state that the hard disk apparatus 1 is attached to the imaging apparatus, set-top box, or the like or removed from it and attached to another AV apparatus.

[0019] That is, the hard disk apparatus 1 is detachably held by an AV apparatus 2 such as an imaging apparatus or a set-top box, and inputs to and receives from the AV apparatus 2 data (hereinafter called AV data) obtained by compressing video data and audio data according to a prescribed format as well as control commands, status data, addresses, etc. that are associated with input/output of such AV data. Further, the hard disk apparatus 1 records such AV data on hard disks 3 and reproduces and outputs AV data recorded on the hard disks 3.

[0020] The hard disks 3 are formatted as shown in Fig. 2. That is, the information recording surface of each hard disk 3 is divided into an inner area and an outer area, which are assigned to a system entry area and a data area, respectively.

[0021] The data area is subdivided into clusters, and video data and audio data of a data amount that is equal to a predetermined number of frames are recorded in each cluster. In this embodiment, AV data of 1 GOP are assigned to one cluster in recording AV data that are compressed according to the MPEG (Moving Picture Experts Group) format on the hard disks 3.

[0022] The information recording surface of each hard disk 3 is sectioned into a plurality of concentric zones, and each of the tracks of each zone is sectioned into a plurality of sectors having a predetermined length in the longitudinal direction. Each hard disk 3 is so configured that the number of sectors per track gradually increases as the zone position goes outward, whereby the information recording surface can be utilized efficiently by using the zone bit recording technique in which the recording frequency is varied with the zone.

[0023] In the hard disks 3 that are zoned and sectored in the above manner, a physical address is set by using an information recording surface number, one of track numbers that are assigned consecutively to the tracks of each information recording surface starting from the outermost track, and a sector number that specifies a sector of each track.

File management of user data is performed by using logical addresses that are consecutively set so as to correspond to the physical addresses starting from the outermost track of each information recording surface.

[0024] The logical address is represented by a cluster number, in units of a cluster being a collection of a plurality of logical sectors. The logical sector is a region corresponding to a data recording unit that is set starting from the head region (0th sector; in this case, located on the outermost track) of each information recording surface. In this embodiment, one physical sector corresponds to one logical sector and the logical sector number is given according to the following Equation (1). In Equation (1), the surface number, the track number, and the sector number are those of the physical address.
Equation (1):

\[
\text{(Logical sector number)} = \text{(number of sectors per track)} \times \{(\text{surface number}) + \text{(number of surfaces)} \times (\text{track number}) + \text{(sector number)} - 1
\] (1)

[0026] In this embodiment, the logical sectors are so formed that data of 512 bytes in terms of user data can be recorded in each logical sector, and one cluster is formed by a plurality of logical sectors. In general, one cluster consists of a power-of-2 sectors. In the data area in which user data is to be recorded, and each cluster is identified by one of block numbers (cluster numbers) that are consecutive numbers in which the head of a file area is given a number 2.

[0027] The data area is assigned block numbers that are addresses of the respective clusters that are set in the above manner so that the data area is accessed on a cluster-by-cluster basis by using block numbers as a reference. In this embodiment, the block number is a 4-figure hexadecimal number.

[0028] On the other hand, the system entry area is divided into a boot area, an FAT (fail allocation table) area, and a directory area. Data necessary for booting of the hard disks 3 are recorded in the boot area. Address information etc. that are necessary for access of AV data recorded in the data area are recorded in the FAT area and the directory area.

[0029] Specifically, the file names of respective files recorded in the data area, the block numbers of head blocks as the recording start positions of respective files, and other information are recorded in the directory area. The block numbers of respective blocks that immediately follow the head block of each file and other information are recorded in the FAT area. In the hard disks 3 thus formatted, the addresses of consecutive clusters constituting one file can be detected by detecting the head block number of a desired file name from the directory area and then sequentially detecting block numbers immediately following the head block number from the FAT area.

[0030] As shown in Fig. 2, in a case where file-1 is recorded in clusters having block numbers 1234h-1240h of the data area, a code indicating the block number 1234h of the first block of file-1 is recorded in the directory area and block numbers immediately following the block number 1234h are consecutively recorded in corresponding regions of the FAT area. In Fig. 2, the term EOF (end of file) is identification information indicating the last block of one file.

[0031] More specifically, file management data having a structure shown in Fig. 3 is recorded in the directory area for each file that is recorded in the data area. In the file management data, the first 8 bytes are assigned to a file name and the next 3 bytes are assigned to a file extension. The next 1 byte is assigned to data indicating the attribute of the file and the next 10 bytes are assigned to reserve data. The next three sections each being 2 bytes are assigned to recording start time data, recording date data, and a cluster number that is a head block number, respectively. The last 4 bytes are assigned to file length data.

[0032] On the other hand, as shown in Fig. 2, block addresses are assigned to respective block numbers (cluster numbers) of the data area and the block addresses of clusters following each head block address are recorded in the FAT area. Further, as shown in Fig. 4, among codes that are not assigned to any block number, prescribed codes are assigned to pieces of identification information indicating a free region, a defective cluster, and EOF.

[0033] In the hard disks 3 thus formatted, free regions of the data area can be detected by accessing the FAT area.

[0034] As shown in Fig. 1, an interface control circuit 4, which is an SCSI (small computer system interface) controller, an IDE (intelligent drive electronics) controller, or the like, serves as an input/output circuit for data, control commands, addresses that are exchanged between the head disk apparatus 1 and the AV apparatus 2. A buffer memory 5 temporarily holds AV data that is subjected to input/output between a hard disk control circuit 6 and the interface control circuit 4.

[0035] A servo circuit 7 drives a motor (M) 8 under the control of the hard disk control circuit 6, thereby rotating the hard disks 3 at a prescribed rotation speed. The servo circuit 7 drives a motor (M) 9 in a similar manner, thereby performing magnetic head seeking and tracking control.

[0036] During recording, a read data channel section 10 adds, under the control of the hard disk control circuit 6, error correcting codes to AV data that is input from the hard disk control circuit 6. Further, the read data channel section 10 generates bit-series data by coding the AV data according to a scheme suitable for the characteristics of the recording/reproduction system, and drives a magnetic head based on the generated data. During reproduction, the read data channel section 10 generates reproduction data by performing signal processing on a reproduction signal that is obtained by a magnetic head, reproduces AV data by performing error correction processing on the reproduction data, and outputs the reproduced AV data to the hard disk control circuit 6.

[0037] Like the system entry area of the hard disks 3, the internal recording area of a system entry memory 11, which is a nonvolatile memory, is divided into a boot area, an FAT area, and a directory area. The system entry memory 11 holds, in these areas, the same data as recorded in the respective areas of the system entry area of the hard disks 3. Under the control of the hard disk control circuit 6, the contents of the system entry memory 11 are updated sequen-
tially as AV data is recorded on the hard disks 3 on a cluster-by-cluster basis. Further, the system entry memory 11 outputs data held therein to the hard disk control circuit 6 with prescribed timing.

[0038] The hard disk control circuit 6, which is a controller for controlling the operation of the hard disk apparatus 1, analyzes a control command that is input from the interface control circuit 4 and controls the entire operation by executing a prescribed process in accordance with a result of the analysis.

[0039] Fig. 5 is a flowchart showing a process that is executed by the hard disk control circuit 6. The hard disk control circuit 6 executes this process when receiving a write control command from the AV apparatus 2. That is, when the hard disk control circuit 6 receives a write control command, the process goes from step SP1 to step SP2, where the hard disk control circuit 6 searches the FAT area of the system entry memory 11 for the code 0000h of a free region shown in Fig. 4 and thereby detects a free region of the hard disks 3.

[0040] Then, the process goes to step SP3, where the hard disk control circuit 6 generates file management data based on a file name and an extension that are added to the write control command and the block number of the free region that was detected at step SP2, and records the generated file management data in the system entry memory 11. The process then goes to step SP4, where the hard disk control circuit 6 records AV data of one cluster in the free region of the hard disks 3 that was detected at step SP2.

[0041] Then, the process goes to step SP5, where the hard disk control circuit 6 judges whether all AV data have been recorded. If a negative judgment result is obtained, the process goes to step SP6, where the hard disk control circuit 6 detects the next free region of the hard disks 3 from the FAT area of the system entry memory 11. The process then goes to step SP7, where the hard disk control circuit 6 updates the contents of a region of the FAT area of the system entry memory 11 that corresponds to the cluster in which the AV data was recorded at step SP4 so that the cluster number (block number) of the free region that was detected at step SP6 is identified. The process then returns to SP4.

[0042] By repeatedly executing steps SP4-SP7, the hard disk control circuit 6 sequentially detects free regions from the system entry memory 11 and records AV data on a cluster-by-cluster basis. In synchronism with this operation, the hard disk control circuit 6 sequentially updates the FAT area of the system entry memory 11.

[0043] When all the AV data have been recorded by repeating the above cluster recording operation, an affirmative judgment result is obtained at step SP5, whereupon the process goes to step SP8. At step SP8, the hard disk control circuit 6 sets one of the codes FFFFh to FFFFFh indicating EOF for a region of the FAT area of the system entry memory 11 that corresponds to a cluster in which AV data were recorded immediately before at step SP4.

[0044] Then, the process goes to step SP9, where the hard disk control circuit 6 updates the system entry area of the hard disks 3 based on the data that have been recorded in the system entry memory 11. The process then goes to step SP10, where the execution of the process is finished. In this manner, during recording of AV data, the hard disk control circuit 6 acquires the data area of the hard disks 3 based on data recorded in the system entry memory 11.

[0045] On the other hand, Fig. 6 is a flowchart showing a process that is executed by the hard disk control circuit 6 when it receives a reproduction control command. When the hard disk control circuit 6 receives a reproduction control command, the process goes from step SP11 to step SP12, where the hard disk control circuit 6 searches the directory area of the system entry memory 11 based on a file name that is added to the control command and thereby detects corresponding file management data recorded in the directory area. Further, the hard disk control circuit 6 detects the head block number of the file designated by the control command from the detected file management data.

[0046] Then, the process goes to step SP13, where the hard disk control circuit 6 reproduces a cluster of the hard disks 3 that is identified by the head block number. At the next step SP14, the hard disk control circuit 6 detects a corresponding code that is in the form of a FAT address by searching the FAT area of the system entry memory 11.

[0047] Then, the process goes to step SP15, where the hard disk control circuit 6 judges whether the code that was detected at step SP14 is a code indicating the end of the file (EOF). If a negative result is obtained at step SP15, the process returns to step SP13, where the hard disk control circuit 6 reproduces a cluster of the hard disks 3 that is identified by the code.

[0048] As described above, when receiving a reproduction control command, the hard disk control circuit 6 detects the head block number of a corresponding file from the directory area and then sequentially reproduces AV data by sequentially detecting block numbers following the head block number from the FAT area by repeatedly executing steps SP13-SP15.

[0049] If a code indicating the end of the file (EOF) is detected after sequential reproduction of clusters, the process goes to step SP16, where the hard disk control circuit 6 finishes the execution of the process. In this manner, the hard disk control circuit 6 accesses the hard disks 3 based on data recorded in the system entry memory 11 also during reproduction of AV data.

[0050] On the other hand, Fig. 7 is a flowchart showing a process that is executed by the hard disk control circuit 6 at starting. When supplied with power, the hard disk control circuit 6 initializes the entire hard disk apparatus 1 in accordance with the contents of the boot area of the system entry memory 11 and then executes the process of Fig. 7. Specifically, the process goes from step SP21 to step SP22, where the hard disk control circuit 6 checks the contents of the system entry memory 11.
The hard disk control circuit 6 judges whether EOF is set for each file management data that is recorded in the directory area by sequentially tracing the data of the FAT area. At the occurrence of an abnormal termination such as one at a power shutoff, a recording operation is interrupted and hence it is difficult to record EOF for file management data concerned.

If there exists no file management data for which EOF is not set, the hard disk control circuit 6 judges at the next step SP23 that no abnormal termination occurred. The process then goes to step SP24, where the execution of the process is finished.

On the other hand, if there exists at least one file management data for which EOF is not set, the hard disk control circuit 6 judges that an abnormal termination occurred. The process goes from step SP23 to step SP25, where the hard disk control circuit 6 detects an FAT address corresponding to a cluster that was successfully recorded immediately before the abnormal termination by sequentially tracing the codes for the file management data concerned in the FAT area. Further, the hard disk control circuit 6 sets an EOF code in the region of this FAT address and thereby reconstructs the contents of the system entry memory 11.

Then, the process goes to step SP26, the hard disk control circuit 6 updates the system entry area of the hard disks 3 based on the contents of the system entry memory 11. The process then goes to step SP24, where the execution of the process is finished. In this manner, the hard disk apparatus 1 can reproduce so far recorded AV data even at the occurrence of an abnormal termination.

Further, prior to execution of the process of Fig. 7, the hard disk control circuit 6 checks the contents of the system entry area of the hard disks 3 and the contents of the system entry memory 11. In doing so, if data cannot be received correctly from the system entry area or the system entry memory 11 due to a crash of the hard disks 3, an abnormality in a memory chip constituting the system entry memory 11, or some other reason, the hard disk control circuit 6 rewrites the contents of one of the system entry area of the hard disks 3 and the system entry memory 11 where the abnormality occurred based on the contents of the other. This allows the hard disk apparatus 1 to reproduce recorded AV data even if an abnormality occurs due to, for example, a drop during carrying of the hard disk apparatus 1. The reliability of the hard disk apparatus 1 is increased so much.

(1-2) Operation of first embodiment

If the hard disk apparatus 1 having the above configuration (see Fig. 1) receives a recording control command from the AV apparatus 2 such as an imaging apparatus or a set-top box to which the hard disk apparatus 1 is attached, AV data that is input after the control command is supplied to the read data channel section 10 via the hard disk control circuit 6. The AV data is modulated by the read data channel section 10 into a format that is suitable for recording, and then recorded on the hard disks 3 by driving a magnetic head.

If a reproduction control command is input in a state that the hard disk apparatus 1 is attached to the AV apparatus 2 or removed from it and attached to another AV apparatus, a reproduction signal that is obtained from the magnetic head is processed by the read data channel section 10 and AV data is reproduced and output to the AV apparatus 2 via the hard disk control circuit 6 and the interface control circuit 4.

When the hard disk apparatus 1 performs recording or reproduction, free regions of the hard disks 3 are detected by accessing the system entry memory 11 or the addresses of AV data for which a reproduction instruction has been received are detected. As a result, in the hard disk apparatus 1, the data area of the hard disks 3 can be accessed without the need for accessing the system entry area of the hard disks 3 each time and hence the data area can be accessed with a so much shorter waiting time. Therefore, in this embodiment, high-transfer-rate AV data can be recorded or reproduced on a real-time basis without interruption. By virtue of a short waiting time, the capacity of the buffer memory 5 for temporarily holding AV data can be reduced and the entire configuration can be simplified so much.

Specifically, as shown in Fig. 6, when the hard disk apparatus 1 receives a reproduction command, corresponding file management data is retrieved from the directory area of the system entry memory 11 and the head block number (head cluster number) of the reproduction-instructed file is detected based on the detected file management data. Then, the block number immediately following the head block number is detected by searching recorded FAT addresses corresponding to the head block number. Subsequently, the block numbers of consecutive clusters are detected sequentially by searching the FAT area in similar manners until EOF corresponding to the last block of the file is detected. In this manner, in the hard disk apparatus 1, AV data of blocks corresponding to respective block numbers are reproduced sequentially while the block numbers are detected. Therefore, the AV data can be reproduced by accessing the data area of the hard disks 3 without the need for accessing the system entry area of the hard disks 3 each time.

On the other hand, also in the case of recording, by recording AV data by checking free regions by likewise referring to the system entry memory 11, the AV data can be recorded by accessing the data area of the hard disks 3 without the need for accessing the system entry area of the hard disks 3 each time.

In the hard disk apparatus 1, AV data is recorded on a cluster-by-cluster basis while free regions are
detected by referring to the system entry memory 11 that is a nonvolatile memory. In synchronism with this processing of the recording system, contents of the system entry memory 11 corresponding to recording-completed blocks are updated sequentially. This enables use of so far recorded AV data even at the occurrence of an abnormal termination such as one at a power shutoff.

Specifically, as shown in Fig. 5, in the hard disk apparatus 1, during recording, the block number (FAT address) of a free region is detected from the FAT area of the system entry memory 11 and corresponding file management data is recorded in the directory area of the system entry memory 11 based on the above detection result and a recording command. Free regions following the above first free region are sequentially detected, and codes indicating those consecutive free regions are sequentially set in the FAT area. An EOF code is set for the last block. In the hard disk apparatus 1, AV data are sequentially recorded in blocks of respective free regions while the free regions are detected. Therefore, the AV data can be recorded by accessing the data area of the hard disks 3 without the need for accessing the system entry area of the hard disks 3 each time.

Further, in the hard disk apparatus 1, after the recording, the contents of the system entry memory 11 are recorded in the system entry area of the hard disks 3.

If the power is shut off, the recording is suspended because of occurrence of an abnormality in some apparatus, or the hard disk apparatus 1 is erroneously removed from the AV apparatus during the recording in a process that AV data are recorded sequentially, EOF indicating the end of a file is not set in the system entry memory 11. As shown in Fig. 7, in the hard disk apparatus 1, the contents of the system entry memory 11 are checked when the power is turned on. If file management data for which EOF is not set is detected, codes of the FAT area are sequentially traced based on the FAT address of the head block number that is recorded as part of the file management data and a block number for which processing was done successfully immediately before the abnormal termination is detected based on the codes that are set in the FAT area. An EOF code is set instead of this block number. This makes it possible to use even a file for which recording has not completed yet.

Further, in the hard disk apparatus 1, the system entry area of the hard disks 3 and the system entry memory 11 hold the same data. If an abnormality is found in the system entry area of the hard disks 3 or the system entry memory 11 in the above-described check that is performed when the power is turned on, the contents of one of the system entry area of the hard disks 3 and the system entry memory 11 where no abnormality has occurred are rewritten to the other.

This allows the hard disk apparatus 1 to reproduce recorded AV data even when an abnormality occurs due to, for example, a drop during carrying of the hard disk apparatus 1, and the reliability of the hard disk apparatus 1 is increased so much.

(1-3) Advantages of first embodiment

In the above configuration, address information etc. that are necessary for access of the data area of the hard disks 3 are recorded in the system entry memory 11 that is a nonvolatile memory and the data area of the hard disks 3 is accessed based on the contents of the system entry memory 11. Therefore, the data area can be accessed with a short waiting time.

Continuous AV data is recorded in the hard disks 3 so as to be sectioned into clusters. In synchronism with this processing of the recording system, contents of the system entry memory 11 that correspond to recording-completed clusters are sequentially updated. Therefore, so far recorded data can be used as effective data even at the occurrence of an abnormal termination.

Further, since the system entry area of the hard disks 3 and the system entry memory 11 hold the same data, recorded AV data can be reproduced even when an abnormality occurs due to, for example, a drop during carrying of the hard disk apparatus 1. The reliability of the hard disk apparatus 1 is increased so much. In particular, since the hard disk apparatus 1 is detachably held by any of various kinds of AV apparatuses, increased reliability improves the ease of use.

(2) Second Embodiment

(2-1) Configuration of second embodiment

Fig. 8 is a block diagram showing a hard disk apparatus 21 according to a second embodiment. In the hard disk apparatus 21, the data area and the system entry area that were described above with reference to Fig. 2 are formed on hard disks 22 and in a system memory 23, respectively, and a write information area is formed in the system memory 23. The components of this embodiment having the same components in the above-described hard disk apparatus 1 with reference to Fig. 1 are given the same reference numerals as the latter and redundant descriptions will be avoided.
Specifically, the data area is formed on the hard disks 22 on a cluster-by-cluster basis (block-by-block basis) in the same manner as in the above-described case of the hard disks 3 with reference to Fig. 1. On the other hand, information to be recorded in the system entry area of the hard disks 3 that was described above with reference to Fig. 1 is recorded in the system entry area of the system memory 23, which is a nonvolatile memory. That is, in the hard disk apparatus 21, address information that is necessary for access of the hard disks 22 is recorded in the system memory 23, whereby the data area of the hard disks 22 can be accessed with a short waiting time.

Further, information that enables judgment of whether data is being written or not and information that enables recognition of the status of progress of the data writing are recorded in the write information area of the system memory 23. Recorded contents are reset upon completion of the data writing. Examples of those kinds of information are a write underway flag indicating that data is being written to the hard disks 22, a write head block number indicating the head block number of a file that is being written to the hard disks 22, and a number-of-written-blocks count value indicating the number of writing-completed blocks of the file.

A system control circuit 24 records data that is input from the AV apparatus 2 on the hard disks 22 while sequentially updating the contents of the write information area. The system control circuit 24 accesses the contents of the write information area at starting. Therefore, even at the occurrence of an abnormal termination, data that has been recorded before the abnormal termination can be used as effective data.

Fig. 9 is a flowchart showing a process that is executed by the system control circuit 24 during writing. The process goes from step SP31 to step SP32, where the system control circuit 24 receives a write command. Then, the process goes to step SP33, where the system control circuit 24 detects a free region of the hard disks 22 by searching the FAT area of the system entry area that is formed in the system memory 23.

Then, the process goes to step SP34, where the system control circuit 24 controls the entire operation so that one block of AV data that is input from the AV apparatus 2 is recorded in this free region. In parallel with this control, the system control circuit 24 updates the write information area so as to allow recognition of the fact that data is being written as well as recognition of the status of progress of this data writing.

Specifically, the system control circuit 24 sets a write underway flag and thereby records, in the system memory 23, the fact that data is being written. Further, the system control circuit 24 sets, as a write head block number, the block number of the free block that was detected at step SP33, and sets the number-of-written-blocks count value at 0. After completion of the writing of one block, the system control circuit 24 increments the number-of-written-blocks count value by 1.

Then, the process goes to step SP35, where the system control circuit 24 judges whether all blocks have been written. If a negative result is obtained at step SP35, the process goes to step SP36, where a free region of the hard disks 22 is detected in the same manner as at step SP33.

Then, the process goes to step SP37, where the system control circuit 24 controls the entire operation so that 1-block AV data that is input from the AV apparatus 2 is recorded in the free region just detected. After the recording of the 1-block data has been completed by the above control, the system control circuit 24 updates the write information area; specifically, the system control circuit 24 increments the number-of-written-blocks count value so as to allow recognition of the fact that the data writing has made a progress. The process then returns to step SP35.

In this manner, after updating the contents of the write information area so as to allow recognition of the fact that writing is underway, the system control circuit 24 repeatedly executes steps SP35–SP37. That is, while sequentially recording AV data on a block-by-block basis (one block: recording unit), the system control circuit 24 sequentially updates the contents of the write information area so as to allow recognition of the status of progress of the data writing in accordance with the AV data recording. In parallel with the updating of the contents of the write information area, the system control circuit 24 sequentially records block numbers indicating subsequent blocks in the FAT area of the system entry area.

If the recording of the AV data has completed as a result of repetitive AV data writing operations, an affirmative result is obtained at step SP35, whereupon the process goes to step SP38. At step SP38, the system control circuit 24 updates the system entry area so that it reflects the recording of a series of data. Since a subsequent block number is recorded in the FAT area in parallel with recording of 1-block AV data, the system control circuit 24 sets EOF in a region of the FAT area that corresponds to the last block. Further, the system control circuit 24 updates the system entry area by recording file management data as described above with reference to Fig. 3 in the directory area.

Then, the process goes to step SP39, where the system control circuit 24 resets the write information area by resetting the write underway flag. The process then goes to step SP40, where the execution of the process is finished.

In this manner, if writing is terminated abnormally in the system control circuit 24, a write underway flag is kept set in the system memory 23. Therefore, at the next starting, the system control circuit 24 can judge based on the write underway flag whether an abnormal termination occurred during writing. Further, if an abnormal termination occurs, information indicating the status of progress of the data writing at the time of the abnormal termination is held as it is. Therefore, at the next starting, the system control circuit 24 can cope with the abnormal termination by detecting
the information indicating the status of progress of the data writing.

[0083] Specifically Fig. 10 is a flowchart showing a process that is executed by the system control circuit 24 when the power is turned on. When the power is turned on, the process goes from step SP51 to step SP52, where the system control circuit 24 accesses the write information area of the system memory 23 and detects a write underway flag. The process then goes to step SP53, where the system control circuit 24 judges whether the detected write underway flag is set as "writing is underway," and thereby judges whether the stop of operation that was done immediately before the turning-on of the power is an abnormal termination during data writing.

[0084] If a negative result is obtained at step SP53, the process goes to step SP54, where the system control circuit 24 executes a boot process based on boot data that are recorded in the system entry area of the system memory 23. The process then goes to step SP55, where the execution of the process is finished.

[0085] On the other hand, an affirmative result is obtained at step SP53, and then the process goes to step SP56, where the system control circuit 24 detects, from the write information area of the system memory 23, information indicating the status of progress of data writing at the occurrence of the abnormal termination.

[0086] Specifically, the system control circuit 24 detects the head block number of a file that was being recorded at the time of the abnormal termination on the write head block number that is recorded in the write information area. Further, the system control circuit 24 detects what number of blocks as measured from the head block had been written successfully at the time of the abnormal termination based on the number-of-written-blocks count value in the write information area.

[0087] At the next step SP57, the system control circuit 24 repairs the FAT area with a recognition that AV data of blocks that start from the block having the detected head block number and counts the number-of-written-blocks count value were recorded correctly. In this case, since consecutive block numbers corresponding to the number-of-written-blocks count value should be recorded correctly in the FAT area, the system control circuit 24 repairs the FAT area by sequentially tracing FAT addresses by the number of blocks that is equal to the number-of-written-blocks count value starting from the head block number, and setting EOF for the last data-writing-completed block.

[0088] Then, the process goes to step SP58, where the system control circuit 24 records file management data in accordance with the repairing of the FAT area so that an abnormally terminated file with the repaired FAT area can be detected by searching the directory area. After the system entry area is repaired in the above manner so that even the file that was being recorded at the time of the abnormal termination can receive file management in the same manner as other files, the process goes from step SP58 to step SP54, where the system control circuit 24 executes the boot process. The process then goes to step SP55, where the execution of the process is finished.

[0089] With the configuration according to the second embodiment, the data area can be accessed with a short waiting time as in the case of the first embodiment, though address information that is necessary for access of the data area of the hard disks 22 is recorded in only the nonvolatile memory 23.

[0090] Since no system entry area is formed on the hard disks 22, occurrence of an abnormality due to an external disturbance such as a drop can be prevented so much more reliably than in the case where a system entry area is formed on the hard disks.

[0091] Since AV data is recorded while information that allows recognition of the fact that data is being written and information that allows recognition of the status of progress of the data writing are recorded in the nonvolatile memory 23, so far recorded data can be used as effective data even when an abnormal termination occurs.

[0092] Further, since the above kinds of information are expressed as the write underway flag indicating that data is being written, the write head block number indicating the head block number of a file being written, the number-of-written-blocks count value indicating the number of writing-completed blocks, those kinds of information are recorded with a simple configuration and so far recorded data can be used as effective data even when an abnormal termination occurs. Further, repairing work that is done at the occurrence of an abnormal termination can be simplified.

(3) Other Embodiments

[0093] In the first embodiment completely the same data are recorded in the system entry area of the hard disks 3 and the system entry memory 11, and in the second embodiment the system entry area is formed only in the system memory 23. However, the invention is not limited to those cases. The important point is that address data that is necessary for access of the data area be held in a nonvolatile memory. For example, as for file management data, recording of an attribute etc. in the system entry memory may be omitted.

[0094] Although in the second embodiment the write underway count value is recorded separately from the write underway flag, the invention is not limited to such a case. The write underway count value may also serve as the write underway flag. That is, it is possible to judge whether an abnormal termination occurred by resetting the write underway count value to 0 when file writing has completed correctly and judging, at starting, whether the write underway count value is 0 or not. This makes it possible to cope with an abnormal termination with even a simpler configuration.

[0095] Although the above embodiments are directed to the case of coping with an abnormal termination at start-
ing, the invention is not limited to such a case. It is possible to cope with an abnormal termination at various necessary time points such as at a start of the next writing, for example.

[0096] The above embodiments are directed to the case where the data area of the hard disks 3 or 22 is managed by the FAT file system. However, the invention is not limited to such a case and can be applied to a broad range in which the data area is managed by any of various file management systems.

[0097] Although the above embodiments are directed to the case where the invention is applied to a removable hard disk apparatus, the invention is not limited to such a case and can broadly be applied to various disk apparatuses such as a phase change type optical disc apparatus and an optical disc apparatus utilising thermomagnetic recording.

[0098] As described above, at least address information that is necessary for access of an input data recording area of a disk-shaped recording medium is recorded in a nonvolatile memory. Therefore, the data area can be accessed with a short waiting time and so far recorded data can be used as effective data even at the occurrence of an abnormal termination.

Claims

1. A disk apparatus comprising:

   recording means for recording input data on a disk-shaped recording medium;
   a nonvolatile memory in which at least address information that is necessary for access of an input data recording area of the disk-shaped recording medium is to be recorded;
   memory control means for recording the address information in the nonvolatile memory; and
   reproducing means for reproducing data recorded on the disk-shaped recording medium based on contents of the nonvolatile memory.

2. The disk apparatus according to claim 1, wherein:

   the recording means records continuous input data on the disk-shaped recording medium in units of a prescribed block that is set for the disk-shaped recording medium; and
   the memory control means sequentially records the address information corresponding to respective recording-completed blocks in the nonvolatile memory in synchronism with operation of the recording means.

3. The disk apparatus according to claim 1, wherein:

   the recording means records continuous input data on the disk-shaped recording medium in units of a prescribed block that is set for the disk-shaped recording medium;
   the address information is formed by data indicating consecutive blocks for one file of the input data; and
   the memory control means records identification information indicating a file end in the nonvolatile memory for a last block of the one file, and sets the identification information based on the address information at starting.

4. The disk apparatus according to claim 1, wherein the recording means records the same data as held by the nonvolatile memory in a prescribed area of the disk-shaped recording medium.

5. The disk apparatus according to claim 1, wherein:

   the disk apparatus is detachably held by a prescribed video apparatus; and
   the input data is video data that is output from the video apparatus.

6. The disk apparatus according to claim 1, wherein:

   the recording means records the input data on the disk-shaped recording medium in units of a prescribed block that is set for the disk-shaped recording medium; and
   the memory control means records, during recording of the input data, identification information indicating that the input data is being recorded in the nonvolatile memory, and sequentially records the address information and data indicating a status of progress of the recording of the input data both of which correspond to respective recording-completed blocks in the nonvolatile memory in synchronism with the operation of the recording means.

7. The disk apparatus according to claim 1, wherein the memory control means accesses the nonvolatile memory at
a prescribed time point, and repairs the contents of the nonvolatile memory based on a result of the access.

8. The disk apparatus according to claim 6, wherein the memory control means accesses the nonvolatile memory at a prescribed time point, judges whether an abnormal termination occurred based on the identification data recorded in the nonvolatile memory, and updates the contents of the nonvolatile memory based on the data indicating the status of progress of the recording of the input data in accordance with a result of the judgment.
FIG. 1

READ DATA CHANNEL SECTION
10

HARD DISK CONTROL CIRCUIT
6

IF CONTROL CIRCUIT

DATA
ADDRESS
COMMAND

AV APPARATUS

SERVO CIRCUIT

SYSTEM ENTRY MEMORY

BUFFER MEMORY

M

M

22
8
7
11
5
4
FIG. 2

BOOT DATA AREA

FAT ADDRESS

1234h
1235h
1236h
1240h

FAT AREA

SYSTEM ENTRY AREA

FIRST BLOCK NO. OF FILE-1: 1234h

DIRECTORY AREA

DATA AREA

BLOCK NUMBER

1234h
1235h
1236h
1240h

1ST BLOCK OF FILE-1
2ND BLOCK OF FILE-1
3RD BLOCK OF FILE-1

LAST BLOCK OF FILE-1
<table>
<thead>
<tr>
<th>Field</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>File length</td>
<td>4 bytes</td>
</tr>
<tr>
<td>Head cluster number</td>
<td>2 bytes</td>
</tr>
<tr>
<td>Recording date</td>
<td>2 bytes</td>
</tr>
<tr>
<td>Recording time</td>
<td>2 bytes</td>
</tr>
<tr>
<td>Reserve</td>
<td>10 bytes</td>
</tr>
<tr>
<td>Attribute</td>
<td>3 bytes</td>
</tr>
<tr>
<td>Extension</td>
<td>1 byte</td>
</tr>
<tr>
<td>Name</td>
<td>8 bytes</td>
</tr>
</tbody>
</table>
**FIG. 4**

<table>
<thead>
<tr>
<th>FAT VALUE (HEXADECIMAL)</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000h</td>
<td>CORRESPONDING CLUSTER IS FREE</td>
</tr>
<tr>
<td>0002h ~ FFF6h</td>
<td>CORRESPONDING CLUSTER IS DATA-ASSIGNED INDICATES IMMEDIATELY FOLLOWING CLUSTER NUMBER</td>
</tr>
<tr>
<td>FFF7h</td>
<td>INDICATES DEFECTIVE CLUSTER</td>
</tr>
<tr>
<td>FFF8h ~ FFFFh</td>
<td>CORRESPONDING CLUSTER IS DATA-ASSIGNED INDICATE FILE END (EOF)</td>
</tr>
</tbody>
</table>
FIG. 5

START \( \sim \) SP1

DETECT FREE REGION FROM MEMORY 11 \( \sim \) SP2

RECORD FILE MANAGEMENT DATA IN MEMORY 11 \( \sim \) SP3

RECORD 1-CLUSTER DATA \( \sim \) SP4

YES \( \sim \) SP5

COMPLETED?

NO

DETECT FREE REGION FROM MEMORY 11 \( \sim \) SP6

UPDATE FAT AREA OF MEMORY 11 \( \sim \) SP7

SET EOF IN MEMORY 11 \( \sim \) SP8

UPDATE SYSTEM ENTRY AREA OF HARD DISKS \( \sim \) SP9

END \( \sim \) SP10
FIG. 6

SP11 ~ START

SP12 ~ DETECT FIRST BLOCK ADDRESS
       OF CORRESPONDING FILE FROM
       DIRECTORY AREA OF MEMORY 11

SP13 ~ REPRODUCE ONE CLUSTER

SP14 ~ DETECT CORRESPONDING CODE
       FROM FAT AREA OF MEMORY 11

SP15 ~ EOF?
       YES → SP16 ~ END
       NO
FIG. 7

START ~ SP21

CHECK CONTENTS OF MEMORY 11 ~ SP22

ABNORMAL TERMINATION? ~ SP23

NO

YES

RECONSTRUCT CONTENTS OF MEMORY 11 ~ SP25

UPDATE SYSTEM ENTRY AREA OF HARD DISKS ~ SP26

END ~ SP24
FIG. 9

START ~ SP31

RECEIVE WRITE COMMAND ~ SP32

DETECT FREE REGION ~ SP33

START WRITING SET WRITE UNDERWAY FLAG SET WRITE HEAD BLOCK NUMBER SET NUMBER-OF-Written-BLOCKS COUNT VALUE AT 0 ~ SP34

YES ~ SP35

COMPLETED FOR ALL BLOCKS ?

NO

DETECT FREE REGION ~ SP36

START WRITING INCREMENT NUMBER-OF-Written-BLOCKS COUNT VALUE ~ SP37

UPDATE SYSTEM ENTRY AREA ~ SP38

RESET WRITE INFORMATION AREA ~ SP39

END ~ SP40
FIG. 10

START SP51

DETECT WRITE UNDERWAY FLAG SP52

IS "WRITING IS UNDERWAY" SET? SP53

NO

YES

DETECT NUMBER-OF-WRITTEN-BLOCKS COUNT VALUE AND WRITE HEAD BLOCK NUMBER SP56

REPAIR FAT AREA WITH RECOGNITION THAT BLOCKS THAT START FROM BLOCK HAVING WRITE HEAD BLOCK NUMBER AND COUNTS NUMBER-OF-WRITTEN-BLOCKS COUNT VALUE ARE EFFECTIVE SP57

UPDATE DIRECTORY AREA SP58

EXECUTE BOOT PROCESS SP54

END SP55
Recording apparatus and program recording medium

A recording apparatus which is characterized in having recording means which records audio visual data (hereinafter referred to as "AV data") on a recording medium; and file restoration means which, when file management information for managing a file recorded on the recording medium is destroyed or lost while the recording means records the AV data, restores or generates the file management information so as to make it possible to access a portion of the AV data already recorded on the recording medium.

Fig. 2
Description

SPECIFICATION

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a recording apparatus for recording AV data and a program recording medium.

Related Art of the invention

[0002] A broadcasting station for BS broadcasting, CS broadcasting or the like broadcasts programs, using an MPEG2 transport stream. A STB (Set Top Box; satellite broadcasting receiver) receives a broadcast wave carrying the programs, decodes AV data representing the programs, converts the AV data into analog data, and displays on a television monitor.

[0003] Further, as to a program among those which a viewer wishes to enjoy after the program is aired or watch repeatedly, after receipt by the STB, the program is transmitted to a recording apparatus, such as a hard disk device, through an IEEE1394 bus (IEEE standard for High performance Serial Bus described in IEEE1394-1995). The recording apparatus thus records transmitted programs one after another.

[0004] While the recording apparatus thus records AV data, the AV data are written in each recording block of a recording medium. The recording apparatus has, on its main memory, file management information which indicates which recording block stores the AV data. After recording of the AV data finishes, the recording apparatus writes the file management information in the recording medium.

[0005] Fig. 9 shows an example of the file management information. Shown in Fig. 9 is file management information which is used in MS-DOS, Windows, etc. In the example in Fig. 9, there are twelve recording blocks, for the ease of understanding. In reality, there is a commensurable number of recording blocks to a storage capacity of a hard disk.

[0006] The file management information consists of information called an FAT (file allocation table) 50 and information called a directory 53.

[0007] The FAT 50 is a table in which addresses 51, which are addresses of the recording blocks, and Next addresses 52, which are addresses of the next recording blocks, are paired so as to indicate in which order data of files are stored in which recording blocks.

[0008] Meanwhile, the directory 53 is a table for managing files hierarchically, which pairs up file names 54, top addresses 55, which are addresses of top recording blocks which hold the data of the files, and overwrite allowance 56 which denote attributes which represent whether the files are writable only or overwritable, etc.

[0009] Using the FAT 50 and the directory 53, it is possible to manage processes such as creation, editing, deletion of files, etc.

[0010] That is, in a conventional recording apparatus, most recent file management information on a main memory is recorded in a recording medium after AV data are recorded on the recording medium.

[0011] By the way, if power supply to recording apparatus is cut off during recording of AV data, etc., file management information on a main memory is deleted before it is written in a recording medium. This makes it impossible to tell in which portion of the recording medium a portion already recorded of the AV data is recorded, and hence, to access the portion already recorded.

[0012] That is, when the file management information is destroyed or lost during recording of the AV data, it is not possible to access the portion of the AV data already recorded on the recording medium.

SUMMARY OF THE INVENTION

[0013] Considering the problem that it is not possible to access a portion of AV data already recorded on a recording medium if file management information is destroyed or lost during recording of the AV data, the present invention aims to provide a recording apparatus and a program recording medium with which it is possible to restore file management information so that when the file management information is destroyed or lost during recording of AV data, a portion of the AV data already recorded on the recording medium can be accessed.

[0014] The 1st invention of the present invention is a recording apparatus which is characterized in comprising:

- recording means which records audio visual data (hereinafter referred to as "AV data") on a recording medium; and
- file restoration means which, when file management information for managing a file recorded on said recording medium is destroyed or lost while said recording means records said AV data, restores or generates said file management information so as to make it possible to access a portion of said AV data already recorded on said recording medium.

[0015] The 2nd invention of the present invention is a recording apparatus in accordance with said 1st invention, characterized in that said recording means records on said recording medium an address of a top recording block in which said AV data are to be recorded, at the start of recording of said AV data,

said AV data are recorded in continuous recording blocks of said recording medium, and

when said file management information for managing a file recorded on said recording medium is de-
strored or lost during recording of said AV data on said recording medium, said file restoration means recreates said portion already recorded based on the address of said top recording block, finds a discontinuous point, and restores or generates said file management information.

[0016] The 3rd invention of the present invention is a recording apparatus in accordance with said 1st invention, characterized in that said recording means records said AV data in discontinuous recording blocks of said recording medium, and

when said file management information for managing a file recorded on said recording medium is destroyed or lost during recording of said AV data on said recording medium, said file restoration means recreates said portion already recorded utilizing old file management information which is recorded on said recording medium, finds a discontinuous point, and restores or generates said file management information.

[0017] The 4th invention of the present invention is a recording apparatus in accordance with said 3rd invention, characterized in that there is a predetermined rule regarding an order of writing in recording blocks for the purpose of writing said AV data in recording blocks of said recording medium, and

said file restoration means recreates said portion already recorded utilizing said rule.

[0018] The 5th invention of the present invention is a recording apparatus in accordance with any one of said 2nd through 4th inventions, characterized in that said AV data are in compliance with MPEG, and

said discontinuous point is a place where a value of PCR (Program Clock Reference) is discontinuous.

[0019] The 6th invention of the present invention is a recording apparatus in accordance with any one of said 2nd through 4th inventions, characterized in that said AV data are in compliance with MPEG, and

said discontinuous point is a place where a value of PID (Packet Identification) is discontinuous.

[0020] The 7th invention of the present invention is a recording apparatus in accordance with any one of 1st through 6th inventions, characterized in that said recording medium is a hard disk.

[0021] The 8th invention of the present invention is a program recording medium which is characterized in that said program recording medium is readable with a computer, and that said program recording medium stores a program which allows a computer to execute all or some functions of all or some means of a recording apparatus in accordance with any one of 1st through 7th inventions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Fig. 1 is a block diagram showing a structure of the apparatus according to the first embodiment of the present invention.

[0023] Fig. 2 is a block diagram showing a structure of the recording apparatus according to the first embodiment of the present invention.

[0024] Fig. 3 is a drawing for describing a method of detecting a discontinuous point in AV data according to the first embodiment of the present invention.

[0025] Fig. 4 is a drawing showing an example of file management information in the first embodiment of the present invention.

[0026] Fig. 5 is a drawing showing an example of recording history in the first embodiment of the present invention.

[0027] Fig. 6 is a block diagram showing a structure of the recording apparatus according to the second embodiment of the present invention.

[0028] Fig. 7 is a drawing showing an example of file management information in the second embodiment of the present invention.

[0029] Fig. 8 is a drawing showing an example of recording history in the second embodiment of the present invention.

[0030] Fig. 9 is a drawing showing an example of conventional file management information.

Description of Symbols

[0031]

1 recording apparatus
2 STB
3 antenna
4 monitor
5 IEEE1394 bus
6 IEEE1394 I/F
7 recording/reproducing control means
8 hard disk
9 continuity information detecting means
10 discontinuous point detecting means
11 CPU
12 memory
13 file management information
24 directory
28 recording/reproducing control means
38 FAT

PREFERRED EMBODIMENTS OF THE INVENTION

[0032] In the following, embodiments of the present invention will be described with reference to drawings.

(First Embodiment)

[0033] First, a first embodiment will be described.

[0034] Fig. 1 shows a structure of an apparatus according to the first embodiment.

[0035] A recording apparatus 1 and a STB 2 are connected to an IEEE1394 bus 5. Further, an antenna 3 and a monitor 4 are connected to the STB 2.
The IEEE1394 bus is an IEEE standard for high performance Serial Bus described in IEEE1394-1995. The recording apparatus 1 is an apparatus which records AV data and reproduces the recorded AV data. The STB 2 is a set top box (satellite broadcasting receiver) which receives a broadcast wave sent from a broadcasting station, decodes it and displays it on the monitor 4, or decodes AV data sent on the IEEE1394 bus 5 and displays the data on the monitor 4, or transmits AV data received from a broadcasting station to the IEEE1394 bus 5.

In the first embodiment, AV data processed by the recording apparatus 1, STB 2 and the like are transmitted as an MPEG2 transport stream. MPEG is an abbreviation of Motion Picture Expert Group, and MPEG2 refers to the standard promulgated by ISO/IEC under the standard number 13818.

Fig. 2 shows a structure of the recording apparatus 1.

The recording apparatus 1 comprises an IEEE1394 I/F 6, recording/reproducing control means 7, a hard disk 8, continuity information detecting means 9, discontinuous point detecting means 10, a CPU 11, a memory 12, and file management information 13.

The IEEE1394 I/F 6 is an interface for sending and receiving a command, data and the like through the IEEE1394 bus 5. A command is sent and received by asynchronous transmission, while data are sent and received by isochronous transmission which is called "isochronous transmission."

The recording/reproducing control means 7 is means which converts AV data which are outputted as an MPEG2 transport stream sent from the IEEE1394 I/F 6 into a recording format and records the data in the hard disk 8, or reads recorded AV data from the hard disk 8 and outputs the data after converting the data into an MPEG2 transport stream. The recording/reproducing control means 7 also serves as means which reads data of the file management information 13 from the hard disk 8 and records such data.

The hard disk 8 is a hard disk device for recording AV data as a file.

The continuity information detecting means 9 is means which extracts PCR (Program Clock Reference) from AV data which are outputted as an MPEG2 transport stream from the recording/reproducing control means 7.

The discontinuous point detecting means 10 is means which examines a value of detected PCR and finds a place where the value largely changes, to thereby detect the end of AV data.

The CPU 11 is means which creates and updates the file management information and supplies an instruction to the recording/reproducing control means 7.

The memory 12 is an SD-RAM which stores a program, data and the like to be executed by the CPU 11.

The file management information 13 is information which tells in which order data are stored in which recording blocks of the hard disk 8 as files.

Fig. 4 shows an example of the file management information 13. Shown in Fig. 4 is file management information which is used in MS-DOS, Windows, etc. In the example in Fig. 4, there are twelve recording blocks, for the ease of understanding. In reality, there are a commensurable number of recording blocks to a storage capacity of a hard disk.

The file management information consists of information called a FAT (file allocation table) 38 and information called a directory 25.

The FAT 38 is a table in which addresses 22, which are addresses of the recording blocks, and Next addresses 23, which are addresses of the next recording blocks, are paired so as to indicate in which order data of files are stored in which recording blocks. A recording block whose Next address 23 is -1 is not associated with a further recording block to jump to, which means that the recording block is free. EOF denotes the end of a file.

Meanwhile, the directory 24 is a table for managing files hierarchically, which pairs up file names 25, top addresses 26, which are addresses of top recording blocks which hold the data stored in the files, and overwrite allowance 27 which denote attributes which represent whether the files are writable only or overwritable, etc.

The recording/reproducing control means 7 according to the first embodiment is an example of the recording means of the present invention. The continuity information detecting means 9, the discontinuous point detecting means 10 and the CPU 11 according to the first embodiment are an example of the file restoration means.

Next, operations according to such an embodiment will be described.

First, a description will be given on an operation that the STB 2 receives AV data sent from a broadcasting station while the recording apparatus 1 records.

The AV data are transmitted on a broadcast wave in the MPEG2 transport stream format from a broadcasting station.

At the outset, a user operates and sets up the STB 2 to record a program.

In response, utilizing asynchronous transmission, the STB 2 sends a command which instructs the recording apparatus 1 to start recording. The command contains a channel number, too, of a channel in which AV data to be recorded are transmitted.

Receiving the command demanding to start recording, the recording apparatus 1 prepares to start recording.

That is, the CPU 11 instructs the recording/reproducing control means 7 to read the file management information 13 which is recorded in the hard disk 8. In response, the recording/reproducing control means 7
reads the file management information 13. A CPU 11 temporarily stores the retrieved file management information 13 in the memory 12.

[0060] The file management information 13 is stored in the hard disk 8. For recording of data, the file management information 13 is read to the memory 12 and updated. Upon recording of data, the file management information 13 is recorded in the hard disk 8 once again.

[0061] The file management information temporarily stored in the memory 12 is as shown in Fig. 4, for instance. Based on such file management information 13, the CPU 11 determines a recording block to start recording AV data.

[0062] In the example shown in Fig. 4, recording of the AV data is started in the recording block whose address 22 is 8.

[0063] The CPU 11 instructs the recording/reproducing control means 7 to record the address of this recording block in the hard disk 8. Further, the CPU 11 instructs the recording/reproducing control means 7 to write also the time at which recording of the AV data was started in the hard disk 8.

[0064] Still further, the CPU 11 registers the address of this recording block in the file management information 13 as well. The recording/reproducing control means 7 records the address of this recording block and the recording start time in the hard disk, as recording history.

[0065] Fig. 5 shows an example of recording history. In Fig. 5, recording history 39 is a file name, recording start time, recording end time and an address of a recording block as they are grouped as a set. Shown in Fig. 5 is that recording of AV data is to start in the recording block whose address is 8 under the file name of "Program 6" at "10:00:00 in 1999." The recording/reproducing control means 7 records such recording history 39 in the hard disk 8 immediately before recording of AV data starts. The recording history 39, the file management information 13 and the like are written in a system area which is ensured separately from a user area in which AV data are recorded. If recording of AV data ends normally, the CPU 11 and the recording/reproducing control means 7 add the time when recording ended to the recording history 39 which is recorded in the hard disk 8. In Fig. 5, the recording end time is vacant since recording of the AV data is not yet completed.

[0066] Meanwhile, the IEEE1394 I/F 6 waits for an isochronous packet to be transmitted from the IEEE1394 bus 5 in the channel which is assigned with the channel number which is added to the command.

[0067] Next, an STB 2 receives AV data sent from a broadcasting station, and utilizing isochronous transmission, serially transmits the AV data to the IEEE1394 bus 5.

[0068] Recognizing the channel number, the IEEE1394 I/F 6 receives AV data which are sent from the IEEE1394 bus 5 as isochronous packets, and serially outputs the AV data as an MPEG2 transport stream.

[0069] The recording/reproducing control means 7 converts the AV data which are sent as the MPEG2 transport stream into a format for recording, and writes the AV data in a predetermined recording block. As described earlier, the AV data are written in this recording block, first. The address of this recording block is recorded in the hard disk 8.

[0070] As all of the AV data is written in this recording block, referring to the file management information 13, the CPU 11 determines a recording block to write the AV data next. The next recording block is then registered in the file management information 13.

[0071] In the example shown in Fig. 4, "s" assigned to the recording block to write the AV data next is written in the Next address 23 of the recording block whose address 22 is 8.

[0072] In the first embodiment, the recording apparatus 1 writes AV data in continuous recording blocks inside the hard disk 8.

[0073] As all of the AV data is written in this recording block, the CPU 11 instructs the recording/reproducing control means 7 to write AV data in a continuous subsequent recording block. Meanwhile, address of the next recording block is registered in the file management information 13. After converting the AV data into the recording format, the recording/reproducing control means 7 writes the AV data in the next recording block.

[0074] In this manner, the AV data are written in the continuous recording blocks inside the hard disk 8 one after another, while the addresses of the recording blocks in which the AV data are being written are registered in the file management information 13 one after another.

[0075] By the way, assume that a user turns off a power source switch of the recording apparatus 1. For example, the user turns off the power source switch of the recording apparatus 1 after recording for one hour a program which is to be aired for two hours. At this stage, the hard disk 8 holds AV data covering one hour.

[0076] However, it is the memory 12 that stores the file management information 13 which contains addresses of recording blocks in which the AV data are recorded. As the power source switch is turned off, all of the contents on the memory is lost. Since all of the information regarding the addresses of the recording blocks holding the one-hour AV data is deleted upon power off, it is not possible to reproduce the one-hour AV data recorded in the hard disk 8 any more.

[0077] In other words, this is destruction of a file representing the recorded AV data. A seemingly appropriate solution to avoid such a situation is to update the file management information 13 which is stored in the hard disk 8 every time AV data are recorded in a new recording block. To this end, it is necessary to write the file management information 13 in the hard disk 8 while concurrently writing the AV data in the hard disk 8. However, simultaneous recording of the file management information 13 and the AV data incurs very large overhead. This
therefore makes it impossible to continuously record the AV data.

[0078] The recording apparatus 1 according to the first embodiment has a function of restoring a destroyed file in which AV data are recorded in the manner above, to allow normal reproduction of the AV data.

[0079] Next, an operation that the recording apparatus 1 restores a file destroyed in the manner above will be described.

[0080] Assume that a user turns on the power source switch of the recording apparatus 1. In response, the CPU 11 reads the file management information 13 which is recorded in the hard disk 8 through the recording/reproducing control means 7, and stores the file management information 13 in the memory 12.

[0081] The file management information 13 read in this manner, as shown in Fig. 4, does not reflect information regarding destroyed AV data at all.

[0082] Further, the recording history 39 recorded in the hard disk 8 is examined through the recording/reproducing control means 7, to thereby check whether there is a file to which the recording end time is not added. As to AV data having no recording end time added, a file corresponding to the AV data is found to be a file whose AV data are destroyed.

[0083] From the recording history 39 as to the AV data which were not recorded normally as the power source switch was turned off, the recording/reproducing control means 7 learns about an address of a top recording block holding the AV data and reproduces that piece of the AV data.

[0084] The CPU 11 registers addresses of recording blocks in which AV data are being reproduced are stored, one after another in the file management information 13. As described earlier, the AV data are recorded in the continuous recording blocks, and hence, if the top recording block is identified, the AV data can be reproduced. However, it is not possible to know up to which recording block the AV data are recorded.

[0085] Noting this, the continuity information detecting means 9 checks transport packets of the AV data reproduced by the recording/reproducing control means 7 as an MPEG2 transport stream, and when there is a transport packet added with PCR, extracts PCR from that transport packet. The continuity information detecting means 9 thereafter passes the detected PCR to the discontinuous point detecting means 10.

[0086] Now, PCR will be briefly described. PCR is time of day information which is added on the encoder side in order to set or construct STC (System Time Clock) which is a synchronization information which serves as the reference for decoding video and audio. In MPEG2, PCR is expressed in 42 bits and counted at a frequency of 27 MHz, and therefore, it is possible to count for 26.5 hours. PCR is added to transport packets at intervals up to 100 ms. PCR is added to a header portion of a transport packet. It is possible to tell whether PCR is added, from adaptation field control in a header of a transport packet and a 5-flag.

[0087] The discontinuous point detecting means 10 compares the PCR detected by the continuity information detecting means 9 with previously detected PCR. When a comparison value is smaller than a change which would be created if PCR is transmitted for every 100 ms, the discontinuous point detecting means 10 determines that AV data heretofore are continuous. When the comparison value is larger than the change which would be created if PCR is transmitted for every 100 ms, the discontinuous point detecting means 10 determines that the transport packet with the added PCR represents different AV data. In short, the discontinuous point detecting means 10 determines that reproduction went beyond the end of the AV data which were being reproduced.

[0088] Fig. 3 shows an example of transport packets. Assume that AV data are continuous up to a PCR packet 1 (15) bearing PCR and that there is a large difference in value between PCR added to the next PCR-bearing packet 2 (19) and the PCR of the PCR packet 1 (15). This tells that among the AV data, a different set of AV data starts somewhere in a video packet 1 (16), a video packet 2 (17) and an audio packet 1 (18).

[0089] When the discontinuous point detecting means 10 determines reproduction went beyond the end of the AV data in this manner, the discontinuous point detecting means 10 notifies the CPU 11 of a recording block which holds the transport packet which bears the previous PCR so that it is known the AV data are continuous for sure and of a recording position in the recording block. In the example shown in Fig. 3, the AV data are surely continuous up to the PCR packet 1 (15).

[0090] The CPU 11 leaves the addresses up to that of the recording block above in the file management information. If there is an address recorded of a further recording block, the CPU 11 deletes the address and adds information which indicates that the file ends at the recording position informed from the discontinuous point detecting means 10.

[0091] Further, the CPU 11 instructs the recording/reproducing control means 7 to stop reproducing the AV data. In response, the recording/reproducing control means 7 stops reproducing the AV data.

[0092] At last, the CPU 11 records the file management information 13 on the memory in the hard disk through the recording/reproducing control means 7. The recording end time is presumed from the recording start time, and the presumed recording end time is written in the recording history.

[0093] In this manner, it is possible to restore a destroyed file in which AV data are recorded.

[0094] If AV data are recorded repeatedly in the hard disk 8 or recorded AV data are deleted repeatedly, continuous free areas for recording AV data in the hard disk 8 decrease. As this occurs, the CPU 11 relocates recording blocks for recording AV data in such a manner that as large continuous free areas as possible are en-
sured in the hard disk 8.

[0095] In the following, an operation for rearranging recording blocks will be described.

[0096] Assume that the recording apparatus 1 is instructed to rearrange recording blocks for recording AV data. Such an instruction is provided by operating an operation panel not shown of the recording apparatus 1.

[0097] The CPU 11 reads the file management information 13 from the hard disk 8 through the recording/reproducing control means 7, and stores the file management information 13 in the memory 12.

[0098] The recording blocks holding files are thereafter relocated with reference to the file management information 13. When a recording block holding a file is changed, the CPU 11 rewrites the file management information 13 regarding the modified file.

[0099] This process is performed on all files, upon completion of which the CPU 11 reads the file management information 13 from the memory 12 and records the file management information 13 in the hard disk 8 through the recording/reproducing control means 7.

[0100] Since this process takes time, the process may be executed automatically using a timer of the operation panel and setting the timer. More precisely, the power source switch of the recording apparatus 1 is turned on automatically in a time zone designated by the timer, e.g., midnight when a user does not use the recording apparatus 1, the recording blocks are relocated, and the power source switch of the recording apparatus 1 is turned off automatically upon completion of the process. Such rearrangement of recording blocks, however, is executable only when there is no destroyed file. If there is a destroyed file, recording blocks are relocated after restoring the file management information 13.

[0101] As described above, according to the first embodiment, an address of a recording block to start recording AV data is recorded in the hard disk 8 in advance prior to recording of the AV data. Even when the file management information 13 regarding the AV data is lost, the AV data are reproduced based on the address of the recording block in which the AV data were recorded first, and the end point of the AV data is detected in accordance with whether a PCR value is continuous, so that it is possible to restore or generate the file management information 13.

(Second Embodiment)

[0102] Next, a second embodiment will be described.

[0103] Fig. 1 shows a structure of an apparatus according to the second embodiment. The structure of the apparatus according to the second embodiment is identical to that of the first embodiment.

[0104] Fig. 6 shows a structure of a recording apparatus 21 according to the second embodiment. The recording apparatus 21 is different from the recording apparatus 1 according to the first embodiment, in comprising recording/reproducing control means 28 instead of the recording/reproducing control means 7.

[0105] The recording/reproducing control means 28 is means which writes AV data in recording blocks which are not necessarily continuous to each other, unlike in the first embodiment.

[0106] The structure is unless otherwise the same as that of the first embodiment, and therefore, will not be described further.

[0107] The recording/reproducing control means 28 according to the second embodiment is an example of the recording means of the present invention. The continuity information detecting means 9, the discontinuous point detecting means 10 and the CPU 11 according to the first embodiment are an example of the file restoration means.

[0108] Now, operations according to the second embodiment will be described, mainly on differences from the first embodiment.

[0109] First, a description will be given on an operation that the STB 2 receives AV data sent from a broadcasting station while the recording apparatus 21 records the AV data.

[0110] The operation is the same as that in the first embodiment, up to receipt by the recording apparatus 21 of the command for start recording.

[0111] The recording apparatus 21 prepares to start recording.

[0112] More particularly, the CPU 11 instructs the recording/reproducing control means 28 to read the file management information 13 which is recorded in the hard disk 8. In response, the recording/reproducing control means 28 reads the file management information 13. A CPU 11 temporarily stores the retrieved file management information 13 in the memory 12. The file management information 13 read into the memory 12 is as shown in Fig. 7, for instance.

[0113] The file management information 13 consists of an FAT 29 and a directory 32, as in the first embodiment. Unlike in the first embodiment, recording blocks in which AV data are recorded are not continuous to each other.

[0114] Referring to the file management information 13, the CPU 11 determines a recording block to record AV data in. At this stage, unlike in the first embodiment, the CPU 11 does not record an address of this recording block in the hard disk 8. The CPU 11 records the address of this recording block in the file management information 13. Further, the CPU 11 instructs the recording/reproducing control means 28 to write also the time at which recording of the AV data was started in the hard disk 8. The recording/reproducing control means 28 records the recording start time in the hard disk as recording history.

[0115] Fig. 8 shows recording history 36. The recording history 36 is written in a system area in the hard disk 8 which is ensured separately from a user area in which AV data are recorded. If recording of AV data ends normally, the CPU 11 and the recording/reproducing control
means 28 add the time when recording ended to the recording history 36 which is recorded in the hard disk 8.  

0116 Meanwhile, the IEEE1394 I/F 6 waits for an isochronous packet to be transmitted from the IEEE1394 bus 5 in the channel which is assigned with the channel number which is added to the command.  

0117 Next, an STB 2 receives AV data sent from a broadcasting station, and utilizing isochronous transmission, serially transmits the AV data to the IEEE1394 bus 5.  

0118 Recognizing the channel number, the IEEE1394 I/F6 receives AV data which are sent from the IEEE1394 bus 5 as isochronous packets, and serially outputs the AV data as an MPEG2 transport stream.  

0119 The recording/reproducing control means 28 converts the AV data which are sent as the MPEG2 transport stream into a format for recording, and writes the AV data in a predetermined recording block.  

0120 As all of the AV data is written in this recording block, referring to the file management information 13, the CPU 11 determines a recording block to write the AV data next. The next recording block is then registered in the file management information 13.  

0121 In the second embodiment, the recording apparatus 21 writes AV data in free recording blocks in the hard disk 8. Recording blocks to write the AV data in are not necessarily continuous to each other, unlike in the first embodiment.  

0122 As all of the AV data is written in this recording block, the CPU 11 instructs the recording/reproducing control means 28 to write the AV data in the next recording block. Meanwhile, an address of the next recording block is registered in the file management information 13. After converting the AV data into the recording format, the recording/reproducing control means 28 writes the AV data in the next recording block.  

0123 In this manner, the AV data are written in the recording blocks which are not necessarily continuous to each other of the hard disk 8 one after another, while the addresses of the recording blocks in which the AV data are being written are registered in the file management information 13 one after another.  

0124 By the way, assume that a user turns off a power source switch of the recording apparatus 21 as in the first embodiment. This destroys a file of the AV data which are being recorded.  

0125 The recording apparatus 21 according to the second embodiment has a function of restoring a destroyed file in which AV data are recorded in the manner above, to allow normal reproduction of the AV data.  

0126 Next, an operation that the recording apparatus 21 restores a file destroyed in the manner above will be described.  

0127 Assume that a user turns on the power source switch of the recording apparatus 21. In response, the CPU 11 reads the file management information 13 which is recorded in the hard disk 8 through the recording/reproducing control means 28, and stores the file management information 13 in the memory 12.  

0128 The file management information 13 read in this manner, as shown in Fig. 7, does not reflect information regarding destroyed AV data at all.  

0129 Further, the recording history 36 recorded in the hard disk 8 is examined through the recording/reproducing control means 28, to thereby check whether there is a file to which the recording end time is not added. As to AV data having no recording end time added, a file corresponding to the AV data is found to be a file whose AV data are destroyed.  

0130 With reference to the file management information 13, the recording/reproducing control means 28 learns about a top one of recording blocks holding the destroyed piece of the AV data, utilizing a rule stipulating which recording blocks are to hold AV data.  

0131 That is, assume the file management information 13 is as shown in Fig. 7. The file management information 13 denotes a state of the hard disk 8 as it was immediately before the destroyed piece of the AV data were recorded. Hence, the file management information 13 tells that the next recording block to write is the top block which holds the destroyed piece of the AV data.  

0132 The rule regarding an order of writing data in recording blocks may be such a rule that data are written one by one in free recording blocks starting with those blocks having smaller addresses and proceeding to those blocks having larger addresses, and a file 33 which is denoted as overwriteable by overwrite allowance 36 is then overwritten. In accordance with such a rule, it is possible to trace back recording blocks which hold AV data.  

0133 Utilizing such a rule, the recording/reproducing control means 28 learns about addresses of recording blocks which hold AV data and reproduces the AV data.  

0134 The CPU 11 registers addresses of recording blocks which hold currently reproduced AV data one after another in the file management information 13. However, it is not known where the end point of the AV data is, i.e., to which recording block recording has progressed.  

0135 The continuity information detecting means 9 and the discontinuous point detecting means 10, as in the first embodiment, detect an end of the AV data.  

0136 The CPU 11 leaves the addresses up to that of the recording block which is at the end in the file management information. If there is an address recorded of a further recording block, the CPU 11 deletes the address and adds information which indicates that the file ends at a recording position advised from the discontinuous point detecting means 10.  

0137 Further, the CPU 11 instructs the recording/reproducing control means 28 to stop reproducing the AV data. In response, the recording/reproducing control means 28 stops reproducing the AV data.  

0138 At last, the CPU 11 reads the file management information 13 on the memory in the hard disk through the recording/reproducing control means 27.
The recording end time is presumed from the recording start time, and the presumed recording end time is written in the recording history 36.

[0139] While the recording apparatus 21 according to the second embodiment rearranges recording blocks, since this is similar to that in the first embodiment, a description will be omitted.

[0140] In this manner, it is possible to restore a destroyed file.

[0141] Although the foregoing has described that the file management information 13 is restored or generated if the recording apparatus detects a destroyed file after the power source switch of the recording apparatus is turned on in each embodiment, this is not limiting. Setting the timer of the operation panel of the recording apparatus for automatic processing is an alternative. That is, the power source switch of the recording apparatus is turned on automatically in a time zone designated by the timer, e.g., midnight when a user does not use the recording apparatus, and if the recording apparatus detects that there is a destroyed file, the file management information 13 is restored, and the power source switch of the recording apparatus is turned off automatically upon completion of the process. Further alternatively, with the timer of the operation panel set, the file management information 13 may be automatically restored concurrently with automatic rearrangement of recording blocks.

[0142] In addition, although up to where AV data are continuous and where discontinuity starts is detected using PCR in the embodiments, this is not limiting. PTS (Presentation Time Stamp) may be used instead. This is added to a header of an access unit (which is a head of one frame in the case of video and a head of one audio frame in the case of audio) if a transport packet contains the header of the access unit. A large change in PTS can be determined as where AV data becomes discontinuous. While PCR is added to a header of a transport stream, since PTS is added inside a payload of a transport packet, to detect PTS is somewhat more complex than to detect PCR. However, it is possible to achieve an equivalent effect to that obtained using PCR. Still alternatively, PID maybe used. As PID added to transport packets changes, it is possible to extract a discontinuous point in AV data.

[0143] Further, although the foregoing has described the embodiments in relation to where an example of the file management information 13 is file management information that as used in MS-DOS, Windows, etc., this is not limiting. Any file management information used in OS for allowing record in and reproduce from a hard disk can be used, such as HPFS (high performance file system) in OS/2, Mac OS, i-node in UNIX, VFAT (virtual FAT) in windows95 and NTFS (new technology file system) in WindowsNT.

[0144] Further, although the foregoing has described that the recording apparatuses according to the embodiments are for recording AV data in a hard disk, this is not limiting. Any recording medium which can be accessed randomly may be used, such as an optical magnetic disk.

[0145] Further, although the foregoing has described the embodiments in relation to a condition that a file is destroyed as a power source switch is turned off, this is not limiting. The embodiments are applicable also to where a file is destroyed because of other reason.

[0146] Further, although the foregoing has described that the STB and the recording apparatus are connected with each other via the IEEE1394 bus in each embodiment, this is not limiting. The STB and the recording apparatus may be connected with each other via other bus, such as a PCI bus, except for a IEEE1394 bus.

[0147] Further, although the foregoing has described that AV data are an MPEG2 transport stream in the embodiments, this is not limiting. Data may be any stream which contains information with which it is possible to detect a discontinuous point in AV data, such as an MPEG2 program stream, an MPEG1 stream and an MPEG4 stream.

[0148] Further, all or some functions of all or some means of the recording apparatuses according to the present invention may be realized as software using a computer program, or alternatively, as hardware.

[0149] Moreover, the present invention also covers a program recording medium which is characterized in recording a program which allows a computer to execute all or some means of the recording apparatuses according to the present invention.

[0150] As is clear from the above, the present invention provides a recording apparatus and a program recording medium with which it is possible to restore file management information so that when the file management information is destroyed or lost during recording of AV data, a portion of the AV data already recorded on the recording medium can be accessed.

Claims

1. A recording apparatus which is characterized in comprising:

   recording means which records audio visual data (hereinafter referred to as “AV data”) on a recording medium; and

   file restoration means which, when file management information for managing a file recorded on said recording medium is destroyed or lost while said recording means records said AV data, restores or generates said file management information so as to make it possible to access a portion of said AV data already recorded on said recording medium.

2. A recording apparatus in accordance with claim 1, characterized in that said recording means records
on said recording medium an address of a top recording block in which said AV data are to be recorded, at the start of recording of said AV data, said AV data are recorded in continuous recording blocks of said recording medium, and when said file management information for managing a file recorded on said recording medium is destroyed or lost during recording of said AV data on said recording medium, said file restoration means recreates said portion already recorded based on the address of said top recording block, finds a discontinuous point, and restores or generates said file management information.

3. A recording apparatus in accordance with claim 1, characterized in that said recording means records said AV data in discontinuous recording blocks of said recording medium, and when said file management information for managing a file recorded on said recording medium is destroyed or lost during recording of said AV data on said recording medium, said file restoration means recreates said portion already recorded utilizing old file management information which is recorded on said recording medium, finds a discontinuous point, and restores or generates said file management information.

4. A recording apparatus in accordance with claim 3, characterized in that there is a predetermined rule regarding an order of writing in recording blocks for the purpose of writing said AV data in recording blocks of said recording medium, and said file restoration means recreates said portion already recorded utilizing said rule.

5. A recording apparatus in accordance with any one of claims 2 through 4, characterized in that said AV data are in compliance with MPEG, and said discontinuous point is a place where a value of PCR (Program Clock Reference) is discontinuous.

6. A recording apparatus in accordance with any one of claims 2 through 4, characterized in that said AV data are in compliance with MPEG, and said discontinuous point is a place where a value of PID (Packet Identification) is discontinuous.

7. A recording apparatus in accordance with any one of claims 1 through 6, characterized in that said recording medium is a hard disk.

8. A program recording medium which is characterized in that said program recording medium is readable with a computer, and that said program recording medium stores a program which allows a computer to execute all or some functions of all or some means of a recording apparatus in accordance with any one of claims 1 through 7.
Fig. 3

TIME BASE

DISCONTINUOUS POINT 37
Fig. 4

<table>
<thead>
<tr>
<th>FAT 38</th>
<th>NEXT ADDRESS 23</th>
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</thead>
<tbody>
<tr>
<td>ADDRESS 22</td>
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<tr>
<td>1</td>
<td>-1</td>
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<tr>
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<tr>
<td>PROGRAM 5</td>
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</tbody>
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<thead>
<tr>
<th>File Name</th>
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<th>Recording End Time</th>
<th>Address of Recording Block</th>
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</thead>
<tbody>
<tr>
<td>Program 6</td>
<td>10:00:00</td>
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**Fig. 7**

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<td>4</td>
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<td>7</td>
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<td>7</td>
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</tr>
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<td>12</td>
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### Directory 32

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<th>TOP ADDRESS</th>
<th>OVERWRITE ALLOWANCE</th>
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</thead>
<tbody>
<tr>
<td>PROGRAM 4</td>
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<td>Y</td>
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<tr>
<td>PROGRAM 5</td>
<td>3</td>
<td>N</td>
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**Fig. 8**

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<tr>
<th>FILE NAME</th>
<th>RECORDING START TIME</th>
<th>RECORDING END TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRAM 6</td>
<td>10:00:00</td>
<td></td>
</tr>
</tbody>
</table>
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<th>Program 5</th>
<th>Overwrite Allowance</th>
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<tr>
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<tr>
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<td>Application Number:</td>
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<td>International Application Number:</td>
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<tr>
<td>Confirmation Number:</td>
<td>4287</td>
</tr>
<tr>
<td>Title of Invention:</td>
<td>Apparatus and method for searching start position of broadcasting program</td>
</tr>
<tr>
<td>First Named Inventor/Applicant Name:</td>
<td>Dong Chul Chung</td>
</tr>
<tr>
<td>Customer Number:</td>
<td>34610</td>
</tr>
<tr>
<td>Filer:</td>
<td>Samuel Wade Ntiros/Kim Flanagan</td>
</tr>
<tr>
<td>Filer Authorized By:</td>
<td>Samuel Wade Ntiros</td>
</tr>
<tr>
<td>Attorney Docket Number:</td>
<td>LT-0097</td>
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<tr>
<td>Receipt Date:</td>
<td>05-JAN-2012</td>
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<td>Filing Date:</td>
<td>24-JAN-2006</td>
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<td>Time Stamp:</td>
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<tr>
<td>Application Type:</td>
<td>Utility under 35 USC 111(a)</td>
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</table>

**Payment information:**
-Submitted with Payment: no

**File Listing:**
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<th>Document Description</th>
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<th>MultiPart/.zip</th>
<th>Pages (if appl.)</th>
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</thead>
<tbody>
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<td></td>
<td>yes</td>
<td>3</td>
</tr>
</tbody>
</table>
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Dong Chul CHUNG

Confirmation No.: 4287

Group Art Unit: 2621

Examiner: Syed Y. HASAN

Serial No.: 11/337,813

Customer No.: 34610

Filed: January 24, 2006

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

INFORMATION DISCLOSURE STATEMENT

U.S. Patent and Trademark Office
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

Pursuant to 37 C.F.R. §1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO-1449. One copy of each non-U.S. reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the “References Cited” on any patent to issue therefrom.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the indicated date. Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This statement should not be construed as a representation that a search has been made, that information cited in the statement is considered to be and/or is material to patentability, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith. It is further understood that the Examiner will consider information that was cited or submitted to the U.S. Patent and Trademark Office in a prior application relied on under 35 U.S.C. §120. 1138 OG 37, 38 (May 19, 1992).

☐ 1. This Information Disclosure Statement is being filed (i) within three months of the U.S. filing date of a U.S. application other than a CPA continued prosecution application under §1.55(d) OR (ii) within three months of the date of entry of the national stage as set forth in §1.491 in an international application OR (iii) before the mailing date of a first Office Action on the merits OR (iv) before the mailing of a first Office Action after the filing of a Request for continued examination under §1.114. No certification or fee is required. 37 C.F.R. §1.97(b).

☐ 2. This Information Disclosure Statement is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office Action on the merits, but before the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application. 37 C.F.R. §1.97(c).

☐ a. I hereby state that each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application or from the U.S. Patent Office in a related U.S. application, not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(1). No fee is required.

☐ b. I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2).

☐ c. Please charge our Credit Card in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p) per the attached PTO 2038 form. Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information.
3. This Information Disclosure Statement is being filed after the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application, but on or before payment of the Issue Fee. Please charge our Credit Card in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p) per the attached PTO 2038 form. Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information. 37 C.F.R. §1.97(d).
   a. I hereby state that each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterfeit foreign application or from the U.S. Patent Office in a related U.S. application, not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(1).
   b. I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterfeit foreign application or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2).

4. The references were cited in a corresponding foreign application. A copy of the European Search Report dated July 18, 2011 is attached for the Examiner’s information.

5. To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiros
Registration No. 39,318

P.O. Box 8638
Reston, VA 20195
703 766-3777 DYK/SWN/lcf

Date: January 5, 2012

Please direct all correspondence to Customer Number 34610
REQUEST FOR CONTINUED EXAMINATION (RCE)  
TRANSMITTAL UNDER 37 C.F.R. §1.114

DOCKET NUMBER: LT-0097  
Prior Appln Serial No.: 11/337,813  
Filed: January 24, 2006  
Inventor(s): Dong Chul CHUNG  
Confirmation No.: 4287  
Group Art Unit: 2621  
Examiner: Syed Y. HASAN

U.S. Patent and Trademark Office  
Customer Service Window, Mail Stop RCE  
Randolph Building  
401 Dulany Street  
Alexandria, Virginia 22314

Sir:


1. Submission required under 37 C.F.R. §1.114
a. ☒ Previously submitted  
i. ☒ Consider the amendment(s)/reply under 37 C.F.R. §1.116 previously filed on October 17, 2011  
(Any unentered amendment(s) referred to above will be entered).  
ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____  
iii. ☐ Other: ______
b. ☐ Enclosed  
i. ☐ Amendment/Reply  
ii. ☐ Affidavit(s)/Declaration(s)  
iii. ☐ Information Disclosure Statement (IDS)  
iv. ☐ Other: ______

2. Miscellaneous  
a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. §1.103(c) for a period of _____ months. Fee amount $130.00 under 37 C.F.R. §1.17(f) enclosed. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R.§1.17(f) required).  
b. ☐ Other: ______

3. Fees ☒ RCE fee required under 37 C.F.R. §1.17(e); Small Entity $465.00, other than small entity $930.00. The RCE fee under 37 C.F.R. §1.17(e) is required by 37 C.F.R. §1.114 when the RCE is filed.  
☐ Extension of time fee (37 C.F.R. §§1.136 and 1.17)

Payment by:  
a. ☐ Check in the amount of $_____ (Check No. _____) enclosed.  
b. ☒ Please charge my Credit Card.  
c. ☐ Please charge my Deposit Account No. 16-0607 in the amount of $_____. A duplicate copy of this sheet is enclosed.

The Commissioner is hereby authorized to charge payment of any deficiency in the above fees associated with this communication or credit any overpayment to Deposit Account No. 16-0607.

Respectfully submitted,  
KED & ASSOCIATES, LLP

[Signature]

Daniel Y.J. Kim  
Registration No. 36,186  
Samuel W. Nuiros  
Registration No. 39,318

Correspondence Address:  
P.O. Box 221200  
Chantilly, VA 20153-1200  
(703) 766-3777 DYK/SWN/kr

Date: November 17, 2011  
Please direct all correspondence to Customer Number 34610
**Electronic Patent Application Fee Transmittal**

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**Title of Invention:** Apparatus and method for searching start position of broadcasting program

**First Named Inventor/Applicant Name:** Dong Chul Chung

**Filer:** Samuel Wade Ntiros/Kim Flanagan

**Attorney Docket Number:** LT-0097

Filed as Large Entity

**Utility under 35 USC 111(a) Filing Fees**

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This is not a USPTO supplied RCE S830 form.

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/E0/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
**PATENT APPLICATION FEE DETERMINATION RECORD**

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### APPLICATION AS AMENDED – PART II

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11/17/2011

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FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))

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FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))

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Legal Instrument Examiner:

/Viola Rogers/

*If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" in THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" in THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
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34610 7890 11/04/2011
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Advisory Action
Before the Filing of an Appeal Brief

<table>
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<td>Examiner</td>
<td>Art Unit</td>
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<td>SYED HASAN</td>
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## --The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 17 October 2011 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☑️ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

   a) ☑️ The period for reply expires _______ months from the mailing date of the final rejection.

   b) ☑️ The period for reply expires: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

      Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, whichever is later. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☑️ The Notice of Appeal was filed on _______. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☑️ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because

   a) ☑️ They raise new issues that would require further consideration and/or search (see NOTE below);

   b) ☑️ They raise the issue of new matter (see NOTE below);

   c) ☑️ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

   d) ☑️ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: Continuation of 3. NOTE: *The proposed changes in independent claims 1 and 6 raise new issues because the amended claims point to modifications in the claim language that would require a thorough and indepth search for prior art.* Since new issues has been introduced, further study is required by the examiner to proceed with this application. (See 37 CFR 1.116 and 41.33(a)).

4. ☑️ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☑️ Applicant’s reply has overcome the following rejection(s): ________.

6. ☑️ Newly proposed or amended claim(s) ________ would be allowable if submitted in a separate, timely filed amendment canceling the non-Allowable claim(s).

7. ☑️ For purposes of appeal, the proposed amendment(s): a) ☑️ will not be entered, or b) ☑️ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:

   Claim(s) allowed: ________.

   Claim(s) objected to: ________.

   Claim(s) rejected: 1, 4, 6, 8 and 10 - 14.

   Claim(s) withdrawn from consideration: ________.

AFFIDAVIT OR OTHER EVIDENCE

8. ☑️ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

9. ☑️ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10. ☑️ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☑️ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: ________.

12. ☑️ Note the attached information Disclosure Statement(s). (PTO/SB/08) Paper No(s). ________

13. ☑️ Other: ________.

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484
AMENDMENT UNDER 37 CFR § 1.116

U.S. Patent and Trademark Office
Customer Window, Mail Stop AF
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

The following amendments and remarks are submitted in reply to the Final Office Action mailed on August 17, 2011, in connection with the above-identified application.

**Amendments to the Claims** are in the Listing of Claims beginning on page 2.

**Remarks** begin on page 6.
Listing of Claims

1. (Currently Amended) A method for searching a start position of a broadcast program, comprising:

recording a video signal that includes a first broadcast program and a second broadcast program, wherein the first broadcast program changes to the second broadcast program during recording of the video signal;

automatically detecting the start of the second broadcast program during recording of the video signal;

when or after the second broadcast program starts, storing in a memory position information corresponding to a start part of the second broadcast program being recorded on a recording medium hard disk, wherein:

(a) the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information of the start part of the second broadcast program stored separately from position information including an address corresponding to a start part of the first broadcast program, and

(b) the start of the second broadcast program is automatically detected based on Electronic Program Guide (EPG) information or a change in at least one of audio or video corresponding to the video signal;

searching the memory for the position information for the second broadcast program while the second broadcast program is being recorded on the recording medium hard disk; and

reproducing the second broadcast program from the address which corresponds to the start part in the recording medium hard disk indicated by the searched position information, said searching and reproducing being performed before the recording of the
video signal has ended,

wherein the method further comprising:

if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program, wherein the position information in the memory corresponding to the third broadcast program includes a start address of the third broadcast program.

2-3 (Canceled)

4. (Previously Presented) The method according to claim 1, wherein position information is divided and stored in the memory for each of a plurality of broadcast programs including the first and second broadcast programs.

5. (Canceled)

6. (Currently Amended) An apparatus for searching a start position of a broadcast program, comprising:

a controller;

a signal processor outputting a first broadcast program as audio and video;

a recording unit performing a recording operation of a video signal, that includes the first broadcast program and a second broadcast program, on a recording medium hard disk, wherein the first broadcast program changes to the second broadcast program during recording of the video signal;

a detector to automatically detect the start of the second broadcast program during the recording operation, said detecting performed based on Electronic Program Guide (EPG)
information or a change in at least one of audio or video signals; and

a memory storing position information including addresses for a corresponding number of start parts of a plurality of broadcast programs recorded on the recording medium hard disk, the plurality of broadcast programs including the first and second broadcast programs;

wherein if the detector detects that the second broadcast program has started during the recording operation, the controller controls the memory to store position information including the address corresponding to the start part of the second broadcast program being recorded on the recording medium hard disk,

wherein the controller further:

searches the memory for the position information including the address corresponding to the start part of the second broadcast program that is being recorded on the recording medium hard disk, and

reproduces the second broadcast program from the address corresponding to the start part of second broadcast program that is being recorded on the hard disk with reference to the searched position information,

wherein, if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, the controller deletes the position information including an address of the start part of the third broadcast program.

7. (Canceled)

8. (Original) The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.
9. (Canceled)

10. (Original) The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

11. (Previously Presented) The method according to claim 1, wherein the change in at least one of said audio or video signals is detected based on a video period of a substantially black screen and an audio period of substantially no sound simultaneously detected for a predetermined time.

12. (Previously Presented) The apparatus according to claim 6, wherein the detector detects the change in at least one of said audio or video signals based on a video period of a substantially black screen and an audio period of substantially no sound simultaneously detected for a predetermined time.

13. (Previously Presented) The method according to claim 1, wherein the first and second programs are received through a same tuner.

14. (Currently Amended) The apparatus according to claim 46, wherein the first and second programs are received through a same tuner.
REMARKS

Claims 1, 4, 6, 8, and 10-14 are pending.

Applicants submit that the amendments presented herein raise no new issues regarding further searching or consideration by the Examiner. Entry of this paper is therefore respectfully requested.

In the Final Office Action, claims 1 and 13 were rejected under 35 USC § 103(a) for being obvious in view of a Yuen-Arishima combination. Applicants request the Examiner to withdraw this rejection for the following reasons.

Claim 1 has been amended to recite: “if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program, wherein the position information in the memory corresponding to the third broadcast program includes a start address of the third broadcast program.” These features are not taught or suggested by the Yuen and Arishima references, whether taken alone or in combination. Furtherance of claims 1 and 13 to allowance is respectfully requested.

Claims 6, 9, and 14 were rejected under 35 USC § 103(a) for being obvious in view of a Yuen-Arishima-Nishina combination. Claim 6 has been amended to recite features similar to those added by amendment to claim 1. The Nishina patent does not teach or suggest these features. Applicants therefore submit that claim 6 and its dependent claims are allowable over the cited combination.

The remaining § 103 rejections are traversed on grounds that the secondary references of record do not teach or suggest the distinguishing features of base claims 1 and 6.
Regarding these remaining references, in the indicated paragraph of col. 4, lines 23-43 of Molner (US 5,166,886), it is disclosed that the contents of broadcast memory #24 are entirely or selectively replaced with new materials, selectively deleted, selectively added with new materials, verified. But, there is no teaching or suggestion for deletion operation performed “if a position in the hard disk at which data of the second broadcast program is recorded is identical to position information of a third broadcast program stored in the memory” as recited in claims 1 and 6.

Also, the indicated paragraph of col. 8, lines 38-59 of Kanehira (US 7,426,332) discloses the recording method in which the programs which have already been reproduced and still remain on the HDD are deleted from the HDD in order to generate a free area on the HDD to record new programs. This is different from the feature “deleting the position information of the third broadcast program, wherein the position information in the memory corresponding to the third broadcast program includes a start address of the third broadcast program” as recited in base claims 1 and 6.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.
To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y. J. Kim
Registration No. 36,186

Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 221200
Chantilly, Virginia 20153-1200
(703) 766-3777 DvK/SWN/krf
Date: October 17, 2011

Please direct all correspondence to Customer Number 34610

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**  
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**  
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**  
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

EXPEDITED PROCEDURE
UNDER 37 C.F.R. § 1.116

Group Art Unit: 2621

For APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

U.S. Patent and Trademark Office
Customer Window, MAIL STOP AF
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Dear Sir:

Transmitted herewith is an Amendment and/or Reply in the above identified application.

☒ No additional fee is required.
☐ Also attached:

The fee has been calculated as shown below:

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If multiple claims newly presented, add $450.00 $0.00

Fee for extension of time $0.00

TOTAL FEE DUE $0.00

☒ The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 16-0607, including any filing fees under 37 C.F.R. 1.16 for presentation of extra claims and any patent application processing fees under 37 C.F.R. 1.17.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Nitros
Registration No. 39,318

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
(703) 766-3777 DYK/SWN/kf
Date: October 17, 2011

Please direct all correspondence to Customer Number 34610
Q:\Documents\2031-099\300584
PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875
Application or Docket Number 11/337,813
Filing Date 01/24/2006

APPLICATION AS FILED – PART I
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*" If the "Highest Number Previously Paid For" in this space is less than 20, enter "20".
**" If the "Highest Number Previously Paid For" in this space is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner: JACQUELYN WILLIAMS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentially is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
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KED & ASSOCIATES, LLP  
P.O. Box 8638  
Reston, VA 20195  

EXAMINER  
HASAN, SYED Y

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MAIL DATE  DELIVERY MODE  
08/17/2011  PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Office Action Summary

Application No. 11/337,813
Applicant(s) CHUNG, DONG CHUL
Examiner SYED HASAN
Art Unit 2484

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply to the notice will result in ABANDONMENT of this application. See 37 CFR 1.135.

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☑ Responsive to communication(s) filed on 01 June 2011.
2a) ☐ This action is FINAL.
2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☑ Claim(s) 1, 4, 5, 6 and 8 - 14 are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
   5) ☐ Claim(s) _____ is/are allowed.
   6) ☐ Claim(s) 1, 4, 5, 6 and 8 - 14 is/are rejected.
   7) ☐ Claim(s) _____ is/are objected to.
   8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

   a) ☑ All   b) ☐ Some * c) ☐ None of:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____.
   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson’s Patent Drawing Review (PTO-948)
3) ☑ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ______.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 08-06) Office Action Summary Part of Paper No./Mail Date 20110725
DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 4, 5, 6 and 8 - 14 filed on 06/01/2011 have been considered but are moot in view of the new ground(s) of rejection.

Applicant has modified claim 1 and added new limitations. This required a new search and examiner has replaced Kida et al (US 2002/0080277) with Yuen et al (US 5488409). Details of this rejection is provided below.

Based on the rejection presented below, claims 1 and 6 and their dependent claims stay rejected.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579)

Regarding claim 1, Yuen et al discloses a method for searching a start position of a broadcast program (col 12, lines 44 – 51 and col 16, lines 39 – 55 paras 0009 and 0147) comprising:
recording a video signal that includes a first broadcast program and a second broadcast program, wherein the first broadcast program changes to the second broadcast program during recording of the video signal (col 3, lines 1 – 9 and fig 3, col 9, line 48 to col 10, line 24 illustrate first and second broadcast program and recording continues when the changeover occurs as shown by the pointer)

automatically detecting the start of the second broadcast program during recording of the video signal (fig 7, col 16, lines 18 – 44 illustrates start of second broadcast program)

when or after the  second broadcast program starts, storing in a memory position information corresponding to a start part of the second broadcast program being recorded on the recording medium (fig 1, col 6, lines 1 – 50 illustrates the memory utilized to store data and fig 3, col 9, line 48 to col 10, line 24 further illustrates storing of start data); wherein:

(a) the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information of the start part of the second broadcast program stored separately from position information including an address corresponding to a start part of the first broadcast program (fig 3, col 9, line 48 to col 10, line 24 further illustrates storing of start data of each position separately)

(b) the start of the second broadcast program is automatically detected based on Electronic Program Guide (EPG) information or a change in at least one of audio or video corresponding to the video signals (fig 23, col 36, lines 11 – 44 illustrate detecting start of program based on EPG)
searching the memory for the position information for the second broadcast program while the second broadcast program is being recorded on the recording medium (col 10, lines 11 – 24 illustrate searching in memory for location of second broadcast and and fig 3, col 9, line 48 to col 10, line 24 illustrate first and second broadcast program and recording continues when the changeover occurs as shown by the pointer) and

reproducing the second broadcast program from the address which corresponds to the start part in the recording medium indicated by the searched position information (col 46, line 64 to col 47, line 23 and col 47, lines 30 – 45 illustrate reproducing the second program) said

However Yuen et al does not disclose searching and reproducing being performed before the recording operation of the video signal has ended

On the other hand Arishima teaches searching and reproducing being performed before the recording operation of the video signal has ended (col 10, line 54 to col 11, line 2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate searching and reproducing being performed before the recording operation of the video signal has ended as taught by Arishima in the system of Yuen et al in order to efficiently perform recording and reproducing simultaneously.

Regarding claim 13, Yuen et al discloses the method, wherein the first and second programs are received through a same tuner (fig 1, 61, col 7, lines 39 – 45 illustrate a single tuner)
4. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579) and further in view of Tada (US 7286744)

Regarding claim 4, Yuen et al and Arishima disclose the method including the first and second broadcast programs (see claim 1 above) except wherein position information is divided and stored for each of a plurality of broadcast programs.

On the other hand Tada teaches wherein position information is divided and stored for each of a plurality of broadcast programs (col 5, lines 8 – 10 illustrate programs being recorded and lines 30 – 37 illustrate position information being divided and stored)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein position information is divided and stored for each of a plurality of broadcast programs as taught by Tada in the system of Yuen et al and Arishima in order to record information in allocated areas.

Claim 8 is rejected based on claim 4 above.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579) and further in view of Molner et al (US 5166886) and further in view of Kanehira (US 7246332)

Regarding claim 5, Yuen et al and Arishima disclose the method (see claim 1 above) except further comprising, if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third
broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program

On the other hand Molnar et al teaches if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program (col 4, lines 23 – 43)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program as taught by Molner et al in the combined system of Yuen et al and Arishima et al in order to selectively add new material to the material stored in memory.

The combination of Yuen et al, Arishima and Molnar et al do not discloses overwriting it with at least one of information or data corresponding to the second broadcast program

On the other hand Kanehira teaches overwriting it with at least one of information or data corresponding to the second broadcast program (col 8, lines 38 – 59)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate overwriting it with at least one of information or data corresponding to the second broadcast program as taught by Kanehira in the combined system of Yuen et al, Arishima and Molnar et al in order to generate free area for future recording.
6. Claims 6, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579) and further in view of Nishina et al (US 6957386)

Regarding **claim 6**, Yuen et al and Arishima disclose an apparatus for searching a start position of a broadcast program including all of the limitations as described in claim 1 above except for a signal processor outputting a received broadcast program as audio and video

However Nishina et al teaches a signal processor outputting a received broadcast program as audio and video (fig 1, 3 audio, 4 video)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a signal processor outputting a received broadcast program as audio and video as taught by Nishina et al in the combined system of Yuen et al and Arishima in order to effectively search for the start position.

**Claim 9** is rejected based on claim 5 above.

**Claim 14** is rejected based on claim 13 above.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579) in view of Nishina et al (US 6957386) and further in view of Sato (US 7046913)

Regarding **claim 10**, Yuen et al, Arishima and Nishina et al disclose a method (see claim 1 above) except for wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

However Sato teaches wherein the apparatus is installed in a TV or a set top box
which receives digital broadcasts (fig 1, para 0023, illustrates a tuner and a recording apparatus that functions as TV and set top box)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts as taught by Sato in the combined system of Yuen et al, Arishima and Nishina et al in order to provide ease of operation in entering a broadcast program without a user having to perform a special operation.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et al (US 5488409) in view of Arishima et al (US 7433579) and further in view of Campbell et al (US 4536791)

Regarding **claim 11**, Yuen et al and Arishima disclose a method (see claim 1 above) except for wherein the change in at least one of said audio or video signals is detected based on a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

However Campbell et al teaches wherein the change in at least one of said audio or video signals is detected based on a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the change in at least one of said audio or video signals is detected based on a video period of a substantially black screen and an
audio period of substantially no sound are simultaneously detected for a predetermined
time as taught by Campbell et al in the combined system of Yuen et al and Arishima in
order to determine selecting a given channel and provide access to that channel
9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuen et
al (US 5488409) in view of Arishima et al (US 7433579) in view of Nishina et al (US
6957386) and further in view of Campbell et al (US 4536791)

Regarding claim 12, Yuen et al, Arishima and Nishina et al disclose a method
(see claim 6 above) except for wherein the detector detects the change in at least one
of said audio or video signals provides an indication that a video period of a
substantially black screen and an audio period of substantially no sound are
simultaneously detected for a predetermined time.

However Campbell et al teaches wherein the detector detects the change in at
least one of said audio or video signals provides an indication that a video period of a
substantially black screen and an audio period of substantially no sound are
simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the
invention to incorporate wherein the detector detects the change in at least one of said
audio or video signals provides an indication that a video period of a substantially black
screen and an audio period of substantially no sound are simultaneously detected for a
predetermined time as taught by Campbell et al in the combined system of Yuen et al,
Arishima and Nishina et al in order to determine selecting a given channel and provide
access to that channel
Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

    Sato (US 7046913) discloses broadcast program recording apparatus using electronic program guide

    Saito et al (US 6775085) discloses apparatus for recording and reproducing information and information reproducing method

    Kida et al (US 2002/0080277) discloses broadcast program recording apparatus and method for recording broadcast programs

    Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed Y. Hasan whose telephone number is 571-270-1082. The examiner can normally be reached on 9/8/5.

    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thai Tran can be reached on 571-272-7382. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. Y. H./
08/10/2011

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484
# Notice of References Cited

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Dong Chul CHUNG

Confirmation No: 4287

Group Art Unit: 2621

Serial No: 11/337,813

Examiner: Syed Y. HASAN

Filed: January 24, 2006

Customer No: 34610

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

AMENDMENT

U.S. Patent and Trademark Office
Customer Window, Mail Stop Amendment
Randolph Building
401 Dulaney Street
Alexandria, Virginia 22314

Sir:

The following amendments and remarks are submitted in reply to the Office Action mailed on March 1, 2011, in connection with the above-identified application.

Amendments to the Claims are in the Listing of Claims beginning on page 2.

Remarks begin on page 7.
Listing of Claims

1. (Currently Amended) A method for searching a start position of a broadcast program, comprising:

   recording a video signal that includes a first broadcast program and a second broadcast program, wherein the first broadcast program changes to the second broadcast program during recording of the video signal;

   automatically detecting the start of the second broadcast program during recording of the video signal;

   when or after the a second broadcast program starts during a recording operation for recording a first broadcast program on a recording medium, storing in a memory position information corresponding to a start part of the second broadcast program being recorded on a the recording medium, wherein:

   (a) the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information of the start part of the second broadcast program stored separately from position information including an address corresponding to a start part of the first broadcast program, and wherein a determination of whether

   (b) the start of the second broadcast program has started is automatically detected performed based on Electronic Program Guide (EPG)
information or a change in at least one of audio or video corresponding to
the video signal signals;

searching the memory for the position information for the second broadcast
program while the second broadcast program is being recorded on the recording medium; and
reproducing the second broadcast program from the address which corresponds
to the start part in the recording medium indicated by the searched position information, said
searching and reproducing being performed before the recording of the video signal operation
has ended.

2-3  (Canceled)

4.  (Previously Presented) The method according to claim 1, wherein position
information is divided and stored in the memory for each of a plurality of broadcast programs
including the first and second broadcast programs.

5.  (Previously Presented) The method according to claim 1, further comprising:
if a position in the recording medium at which data of the second broadcast
program is recorded is identical to position information of a third broadcast program previously
stored in the memory, deleting the position information of the third broadcast program, wherein
the position information in the memory corresponding to the third broadcast program includes a
start address of the third broadcast program.
6. (Currently Amended) An apparatus for searching a start position of a broadcast program, comprising:

a controller;

a signal processor outputting a first broadcast program as audio and video;

a recording unit performing a recording operation of a video signal, that includes for recording the first broadcast program and a second broadcast program, on a recording medium, wherein the first broadcast program changes to the second broadcast program during recording of the video signal;

a detector to automatically detect the start of the detection unit detecting whether a second broadcast program is started during the recording operation, said detecting performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals; and

a memory storing position information including addresses for a corresponding number of start parts of a plurality of broadcast programs recorded on the recording medium, the plurality of broadcast programs including the first and second broadcast programs; and a control unit,

wherein if the detector detection unit detects that the second broadcast program has started during the recording operation for the first broadcast program, the controller unit controls the memory to store position information including the address corresponding to the start part of the second broadcast program being recorded on the recording medium,

wherein the controller unit further:
searches searching the memory for the position information including the address corresponding to the start part of the second broadcast program that is being recorded on the recording medium, and

reproduces producing the second broadcast program from the address corresponding to the start part of second broadcast program with reference to the searched position information.

7. (Canceled)

8. (Original) The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.

9. (Currently Amended) The apparatus according to claim 6, wherein, if a position in the recording medium at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, the controller unit deletes the position information including an address of the start part of the third broadcast program.

10. (Original) The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

11. (Currently Amended) The method according to claim 1, wherein [[a]] the change in at least one of said audio and or video signals is detected based on provides an indication that
a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

12. (Currently Amended) The apparatus according to claim 6, wherein the detector detects the detection unit detects a change in at least one of said audio and or video signals based on a video period of a substantially black screen and an audio period of substantially no sound simultaneously detected for a predetermined time.

13. (New) The method according to claim 1, wherein the first and second programs are received through a same tuner.

14. (New) The apparatus according to claim 1, wherein the first and second programs are received through a same tuner.
REMARKS

Claims 1-14 are pending.

In the Office Action, claim 1 was rejected under 35 USC § 103(a) for being obvious in view of a Kida-Arishima combination. Applicants request the Examiner to withdraw this rejection for the following reasons.

As indicated in the specification, often times when one program is being recorded, that program will end and another program will start. For example, a user might record a football game and recording may continue after the game ends. As a result, a second program that follows the football game may be recorded. This may happen intentionally or unintentionally.

In order to allow a user to begin watching the second program without having to first watch or fast forward through the first program, the method of claim 1 automatically detects when the second program starts during recording and then records the start time of the second program, so that the second program may be directly accessed. (See, for example, pages 6 and 7 of the specification).

To make these features more evident, claim 1 has been amended to recite:

1) “recording a video signal that includes a first broadcast program and a second broadcast program, wherein the first broadcast program changes to the second broadcast program during recording of the video signal” (see, for example, page 6, lines 12-18, for support), and
2) "automatically detecting the start of the second broadcast program during recording of the video signal" (see, for example, page 6, lines 19-26, for support). The cited references do not teach or suggest these features, whether taken alone or in combination.

The Kida patent discloses a television having two tuners. In operation, the television may receive a first program received through one tuner and receive a second program through the other tuner. A controller may selective switch between the programs during recording, and the programs may be accessed using an electronic program guide. The programs may be searched and played back at a later time. (See Paragraphs [63]-[65] and also page 10 as referenced in the Office Action). The Kida patent, however, does not teach or suggest features 1) and 2) above.

The Arishima patent was cited for disclosing performing a program search and reproducing operation before a recording operation ends. However, Arishima does not teach or suggest features 1) and 2) above added to claim 1.

Based on these differences, it is respectfully submitted that claim 1 is allowable over a Kida-Arishima combination.

In addition to features 1) and 2), claim 1 recites:

"when or after the second broadcast program starts, storing in a memory position information corresponding to a start part of the second broadcast program being recorded on a recording medium;" and that

"the start of the second broadcast program is automatically detected based on Electronic Program Guide (EPG) information or a change in at least one of audio or video corresponding
to the video signal.” These features are not taught or suggested by the cited references, when taken in context with features 1) and 2) above.

In view of the foregoing differences, it is respectfully submitted that claim 1 is allowable.

The remaining § 103 rejections are traversed on grounds that the remaining references of record do not teach or suggest the features added by amendment to claim 1 which are missing from the Kida and Arishima patents, and on grounds that claim 6 has been amended to recite features similar to many of those that patentably distinguish claim 1 from the cited references.

New claims 13 and 14 have been added to the application. These claims recite that “the first and second programs are received through a same tuner.” (See, for example, Figure 3 for support which only shows one tuner). These features are not taught or suggested by the cited references, whether taken alone or in combination. In fact, the Kida patent teaches away from these features by disclosing that its first and second programs are received through different tuners. (See Paragraphs [63]-[65]).

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.
To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y. J. Kim
Registration No. 36,186

Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 221200
Chantilly, Virginia 20153-1200
(703) 766-3777 DYK/SWN/krf
Date: June 1, 2011

Please direct all correspondence to Customer Number 34610
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No.: LT-0097

Confirmation No.: 4287

Dong Chul CHUNG

Group Art Unit: 2621

Serial No.: 11/337,813

Examiner: Syed Y. HASAN

Filed: January 24, 2006

Customer No.: 34610

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

U.S. Patent and Trademark Office
Customer Window, Mail Stop Amendment
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Dear Sir:

Transmitted herewith are an Amendment and/or Reply in the above identified application.

☐ No additional fee is required.
Also attached:

The fee has been calculated as shown below:

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If multiple claims newly presented, add $390.00 $0.00

Fee for extension of time $0.00

TOTAL FEE DUE $0.00

☐ The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 16-0607, including any filing fees under 37 C.F.R. 1.16 for presentation of extra claims and any patent application processing fees under 37 C.F.R. 1.17.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
(703) 766-3777 DVK/SWN/krf
Date: June 1, 2011

Please direct all correspondence to Customer Number 34610

Q:\Documents\2031-099\282263
**PATENT APPLICATION FEE DETERMINATION RECORD**

**APPLICATION AS FILED – PART I**

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Legal Instrument Examiner: /LISA THOMAS/

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" in this space is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" in this space is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Office Action Summary

Application No. 11/337,813
Applicant(s) CHUNG, DONG CHUL
Examiner SYED Y. HASAN
Art Unit 2484

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.\n
- Extensions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) □ Responsive to communication(s) filed on 09 February 2011.
2a) □ This action is FINAL.
2b) □ This action is non-final.
3) □ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) □ Claim(s) 1, 4, 5, 6 and 8 - 12 is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) □ Claim(s) _____ is/are allowed.
6) □ Claim(s) 1, 4, 5, 6 and 8 - 12 is/are rejected.
7) □ Claim(s) _____ is/are objected to.
8) □ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) □ The specification is objected to by the Examiner.
10) □ The drawing(s) filed on _____ is/are: a) □ accepted or b) □ objected to by the Examiner.
   
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) □ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) □ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   
   a) □ All  b) □ Some * c) □ None of:
   
   1. □ Certified copies of the priority documents have been received.
   2. □ Certified copies of the priority documents have been received in Application No. _____.
   3. □ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) □ Notice of References Cited (PTO-892)
2) □ Notice of Draftsperson’s Patent Drawing Review (PTO-948)
3) □ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.
4) □ Interview Summary (PTO-413)
   Paper No(s)/Mail Date _____.
5) □ Notice of Informal Patent Application
6) □ Other: _____.
DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant’s submission filed on 02/09/2011 has been entered.

Response to Arguments

2. Applicant’s arguments with respect to claims 1, 4, 5, 6 and 8 - 12 filed on 02/09/2011 have been considered but are moot in view of the new ground(s) of rejection.

In re page 9 applicant argues with respect to claim 1 that “the cited references do not individually or collectively teach or suggest:

(1) a memory storing position information including addresses for a corresponding number of start parts of a plurality of broadcast programs recorded on the recording medium, the plurality of broadcast programs including the first and second broadcast programs;

(2) if the detection unit detects that the second broadcast program has started during the recording operation for the first broadcast program, the control unit controls the memory to store position information including the address corresponding to the start part of the second broadcast program being recorded on the recording medium,
control unit further:

(3) searching the memory for the position information including the address corresponding to the start part of the second broadcast program that is being recorded on the recording medium, and

(4) producing the second broadcast program from the address corresponding to the start part of second broadcast program with reference to the searched position information.”

In response examiner presents the disclosure of Kida et al (US 2002/0080277). Kida et al discloses that “A recording method of a broadcast program in a broadcast program recording apparatus having a first receiving part for receiving a broadcast wave of a first selected channel and demodulating a first broadcast program, a second receiving part for receiving a broadcast wave of a second selected channel and demodulating a second broadcast program, and a recording medium on which a ring buffer area and a memory area have been formed, comprising: a received program history storing step of additionally storing the channel number, broadcast date, and broadcast time zone of said first broadcast program into a memory in correspondence to each other; a program storing step for performing a recording control operation to control said recording part to record said broadcast program obtained by receiving by said first receiving part into said memory area in accordance with a recording command operation; a searching step for searching said memory for a channel number of a broadcast program having a broadcast date that is precedent to today's
date by a predetermined number of days and a broadcast time zone that coincides with the present time; and a history recording control step of performing a station selection control operation to control said second receiving part to receive the broadcast wave of said channel number searched out by said searching step and performing a recording control operation to control said recording part to record said broadcast program obtained by the reception by said second receiving part into said ring buffer area.” (page 10, claim 17). EPG is disclosed in para 0064. Further clarification is provide in paras 0008 to 0011. This disclosure meets all the four disclosed limitations of the claim. Hence claims 1 and 6 and their dependent claims are rejected.

**Claim Rejections - 35 USC § 103**

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.


Regarding claim 1, Kida et al discloses a method for searching a start position of a broadcast program, comprising:

when a second broadcast program starts during a recording operation for recording a first broadcast program on a recording medium, storing in a memory,
position information corresponding to a start part of the second broadcast program being recorded on the recording medium, wherein the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information stored separately from position information including an address corresponding to a start part of the first broadcast programs and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals; searching the memory for the position information for the second broadcast program while the second broadcast program is being recorded on the recording medium; and reproducing the second broadcast program from the address which corresponds to the start part in the recording medium indicated by the searched position information, said searching and reproducing being performed before the recording operation has ended (paras 0008 to 0011 and 0064 and page 10 claim 17, see argument above)

However Kida et al does not disclose searching and reproducing being performed before the recording operation has ended

On the other hand Arishima teaches searching and reproducing being performed before the recording operation has ended (col 10, line 54 to col 11, line 2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate searching and reproducing being performed before the recording operation has ended as taught by Arishima in the system of Kida et al in order to efficiently perform recording and reproducing simultaneously.
5. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kida et al (US 2002/0080277) in view of Arishima et al (US 7433579) and further in view of Tada (US 7286744)

   Regarding **claim 4**, Kida et al and Arishima disclose the method including the first and second broadcast programs (see claim 1 above) except wherein position information is divided and stored for each of a plurality of broadcast programs.

   On the other hand Tada teaches wherein position information is divided and stored for each of a plurality of broadcast programs (col 5, lines 8 – 10 illustrate programs being recorded and lines 30 – 37 illustrate position information being divided and stored)

   It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein position information is divided and stored for each of a plurality of broadcast programs as taught by Tada in the system of Kida et al and Arishima in order to record information in allocated areas.

   **Claim 8** is rejected based on claim 4 above.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kida et al (US 2002/0080277) in view of Arishima et al (US 7433579) and further in view of Molner et al (US 5166886) and further in view of Kanehira (US 7246332)

   Regarding **claim 5**, Kida et al and Arishima disclose the method (see claim 1 above) except further comprising, if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast
program previously stored in the memory, deleting the position information of the third broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program.

On the other hand, Molnar et al teaches if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program (col 4, lines 23 – 43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program as taught by Molner et al in the combined system of Kida et al and Arishima et al in order to selectively add new material to the material stored in memory.

The combination of Kida et al, Arishima and Molnar et al do not discloses overwriting it with at least one of information or data corresponding to the second broadcast program.

On the other hand, Kanehira teaches overwriting it with at least one of information or data corresponding to the second broadcast program (col 8, lines 38 – 59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate overwriting it with at least one of information or data corresponding to the second broadcast program as taught by Kanehira in the combined system of Kida et al, Arishima and Molnar et al in order to generate
free area for future recording.

7. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kida et al (US 2002/0080277) in view of Arishima et al (US 7433579) and further in view of Nishina et al (US 6957386)

Regarding claim 6, Kida et al and Arishima disclose an apparatus for searching a start position of a broadcast program including all of the limitations as described in claim 1 above except for a signal processor outputting a received broadcast program as audio and video

However Nishina et al teaches a signal processor outputting a received broadcast program as audio and video (fig 1, 3 audio, 4 video)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a signal processor outputting a received broadcast program as audio and video as taught by Nishina et al in the combined system of Kida et al and Arishima in order to effectively search for the start position.

Regarding claim 10, Sato et al discloses the apparatus, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts (fig 1, para 0023, illustrates a tuner and a recording apparatus that functions as TV and set top box)

Claim 9 is rejected based on claim 5 above.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kida et al (US 2002/0080277) in view of Arishima et al (US 7433579) and further in view of Campbell et al (US 4536791)
Regarding **claim 11**, Kida et al and Arishima disclose a method (see claim 1 above) except for wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

However Campbell et al teaches wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time as taught by Campbell et al in the combined system of Kida et al and Arishima in order to determine selecting a given channel and provide access to that channel

9. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kida et al (US 2002/0080277) in view of Arishima et al (US 7433579) in view of Nishina et al (US 6957386) and further in view of Campbell et al (US 4536791)

Regarding **claim 12**, Kida et al, Arishima and Nishina et al disclose a method (see claim 1 above) except for wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.
However Campbell et al teaches wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time as taught by Campbell et al in the combined system of Kida et al, Arishima and Nishina et al in order to determine selecting a given channel and provide access to that channel.

**Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant’s disclosure

Sato (US 7046913) discloses broadcast program recording apparatus using electronic program guide

Saito et al (US 6775085) discloses apparatus for recording and reproducing information and information reproducing method

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed Y. Hasan whose telephone number is 571-270-1082. The examiner can normally be reached on 9/8/5.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thai Tran can be reached on 571-272-7382. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. Y. H./
02/22/2011

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484
Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

   The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 6 and 8 - 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

   An “apparatus for” claim is equivalent to a “means” claim. Where means plus function language is used to define the characteristics of machine or manufacture invention, claim limitations must be interpreted to read on only the structures or materials disclosed in the specification and “equivalents thereof.” The scope of a “means” limitation is defined as the corresponding structure or material (e.g., a specific logic circuit) set forth in the written description and equivalents. See MPEP § 2181 through § 2186. Thus, a claim using means plus function limitations without corresponding disclosure of specific structures or materials that are not well-known fails to particularly point out and distinctly claim the invention. Dossel, 115 F.3d at 946-47, 42 USPQ2d at 1884-85.

   Claims 6 and 8 - 12 are therefore interpreted as a single means claim i.e. where
a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714 – 715, 218 USPQ 195, 197 (Fed. Cir. 1983). When claims depend on a recited property, a fact situation comparable to Hyatt is possible, where the claim covers every conceivable structure (means) for achieving the stated property (result) while the specification discloses at most only those known to the inventor. (Do you understand 112, 6th and single means claim?) (Does not apply, should be removed)
Notice of References Cited

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**NON-PATENT DOCUMENTS**

*Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages*

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.*
### Search Notes

**11337813**

**Examiner**
SYED Y HASAN

**Art Unit**
2484

### SEARCHED

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### INTERFERENCE SEARCH

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**U.S. Patent and Trademark Office**

Part of Paper No.: 20110222
### Index of Claims

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REQUEST FOR CONTINUED EXAMINATION (RCE)
TRANSMITTAL UNDER 37 C.F.R. §1.114

DOCKET NUMBER: LT-0097
Prior Appln Serial No.: 11/337,813
Filed: January 24, 2006
Inventor(s): Dong Chul CHUNG
Confirmation No.: 4287
Group Art Unit: 2621
Examiner: Syed Y. HASAN

U.S. Patent and Trademark Office
Customer Service Window, Mail Stop RCE
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:


1. Submission required under 37 C.F.R. §1.114
   a. ☐ Previously submitted
      i. ☐ Consider the amendment(s)/reply under 37 C.F.R. §1.116 previously filed on ____ (Any unentered amendment(s) referred to above will be entered).
      ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on ____
   b. ☒ Enclosed
      i. ☒ Amendment/Reply
      ii. ☐ Affidavit(s)/Declaration(s)
      iii. ☐ Information Disclosure Statement (IDS)

2. Fees ☒ RCE fee required under 37 C.F.R. §1.17(e); Small Entity $405.00, other than small entity $810.00. The RCE fee under 37 C.F.R. §1.17(e) is required by 37 C.F.R. 1.114 when the RCE is filed.
   ☐ Extension of time fee (37 C.F.R. §§1.136 and 1.17)

   Payment by:
   ☒ Please charge my Credit Card.

   The Commissioner is hereby authorized to charge payment of any deficiency in the above fees associated with this communication or credit any overpayment to Deposit Account No. 16-0607. A duplicate copy is enclosed.

Respectfully submitted,
KED & ASSOCIATES, LLP

[Signature]
Daniel Y.J. Kim
Registration No. 39,318
Samuel W. Nitos
Registration No. 39,318

Correspondence Address:
P.O. Box 8638
Reston, VA  20191
(703) 766-3777 DYK/SWN/krf
Date: February 9, 2011
Please direct all correspondence to Customer Number 34610
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Dong Chul CHUNG

Confirmation No: 4287

Group Art Unit: 2621

Serial No: 11/337,813 Examiner: Syed Y. HASAN

Filed: January 24, 2006 Customer No: 34610

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

SUBMISSION UNDER 37 CFR § 1.114

U.S. Patent and Trademark Office
Customer Window, Mail Stop RCE
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

The following amendments and remarks are submitted with a Request for Continued Examination filed after issuance of the Final Office Action mailed on November 9, 2010, in connection with the above-identified application.

Amendments to the Claims are in the Listing of Claims beginning on page 2.

Remarks begin on page 6.
Listing of Claims

1. (Currently Amended) A method for searching a start position of a broadcast program, comprising:

   when a second broadcast program starts during a recording operation performed for recording a first broadcast program on a recording medium, storing in a memory position information corresponding to a start part of the second broadcast program being recorded on the recording medium in a memory, wherein the position information in the memory includes an address corresponding to the start part of the second broadcast program, the position information [[is]] stored separately from position information including an address corresponding to a start part of the first broadcast program, and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals;

   searching the memory for the position information which corresponds to the start part of the second broadcast program while the second broadcast program is being recorded [[in]] on the recording medium; and

   reproducing the second broadcast program from the address which corresponds to the start part in the recording medium indicated by the searched position information stored in the memory, said searching and reproducing being performed before the recording operation has ended.

2-3 (Canceled)
4. (Currently Amended) The method according to claim 1, wherein position information is divided and stored in the memory for each of a plurality of broadcast programs including the first and second broadcast programs.

5. (Currently Amended) The method according to claim 1, further comprising:

if a position in the recording medium at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program, wherein the position information in the memory corresponding to the third broadcast program includes a start address of the third broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program.

6. (Currently Amended) An apparatus for searching a start position of a broadcast program, comprising:

a signal processor outputting a first broadcast program as audio and video;

a recording unit performing a recording operation for recording the first broadcast program [In] on a recording medium;

a detection unit detecting whether a second broadcast program is started during the recording operation, said detecting performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals;

a memory storing position information corresponding to including addresses for a corresponding number of start parts of a plurality of broadcast programs recorded on the
recording medium, the plurality of broadcast programs including the first and second broadcast programs; and

a control unit controlling storage of the position information which corresponds to the start part of the second broadcast program in the memory, wherein if the detection unit detects that the second broadcast program has started during the said recording operation for the first broadcast program, the control unit controls the memory to store position information including the address corresponding to the start part of the second broadcast program being recorded on the recording medium, the control unit further:

searching [[for]] the memory for the position information including the address stored in the memory corresponding to the start part of the second broadcast program that is being recorded [[in]] on the recording medium, and

producing the second broadcast program from the address corresponding to reproducing the start part of second broadcast program recorded in the recording medium with reference to the searched position information.

7. (Canceled)

8. (Original) The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.

9. (Currently Amended) The apparatus according to claim 6, wherein, if a position in the recording medium at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, the control
unit deletes the position information including an address of the start part of the third broadcast program and overwrites it with at least one of data or information corresponding to the second broadcast program.

10. (Original) The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

11. (Previously Presented) The method according to claim 1, wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

12. (Currently Amended) The apparatus according to claim 6 [[1]], wherein the detection unit detects a change in audio and video signals provides an indication that based on a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.
REMARKS

Claims 1 and 4-6, 8-12 are pending.

In the Office Action, claim 1 was rejected under 35 USC § 112, second paragraph, on grounds that unclear language was used to identify each of the programs recited in this claim. Claim 1 has been amended to clarify these features with the replacement phrases, “first broadcast program” and “second broadcast program.” Withdrawal of the § 112 rejection is respectfully requested.

Claims 1 and 2 were rejected under 35 USC § 103(a) for being obvious in view of a Saito-Nishina combination. Applicants request the Examiner to withdraw this rejection for the following reasons.

The Saito publication discloses a video recorder which is programmed by a user to begin recording a television show. (See Paragraph [34]).

The Nishina patent discloses use of an electronic program guide to record television programs.

However, neither reference teaches or suggests the features added by amendment to claim 1. That is, Saito and Nishina do not teach or suggest that when a second broadcast program starts during a recording operation performed for recording a first broadcast program on a recording medium, storing position information corresponding to a start part of the second broadcast program in a memory.

Claim 1 further recites that the position information corresponding to the start part of the second broadcast program is stored separately from position information corresponding to the
multiple programs are stored or being stored in real time. This cannot be done based on the start time used by the Sato patent.

To emphasize these differences, claim 1 has been amended to recite that when a second broadcast program starts during a recording operation for recording a first broadcast program on a recording medium, the following is performed: “storing in a memory position information corresponding to a start part of the second broadcast program being recorded on the recording medium, wherein the position information in the memory includes an address corresponding to the start part of the second broadcast program.” (See, for example, Figure 4 where the “SA” in “program #2_SA” means start address. As shown in this figure, a start address in memory is stored for each recorded program.)

The Sato patent does not teach or suggest these features, and neither do the other references of record. For example, the Saito patent discloses a video recorder which is programmed by a user to begin recording a television show)Paragraph [34]), and the Arishima patent discloses performing a searching and reproducing operation. However, neither patent teaches or suggests storing position information that includes a start address in memory corresponding to a start part of a second broadcast program while a first program is recorded.

In addition, claim 1 recites that the position information (which is previously defined to include the address) is stored separately from position information including an address corresponding to a start part of the first broadcast program.” (See, for example, Figure 4 for support). These features are not taught or suggested by the cited references, whether taken alone or in combination.
In addition, claim 1 recites "reproducing the second broadcast program from the address which corresponds to the start part in the recording medium indicated by the searched position information." (See, for example, Figures 4 and 5 and corresponding portions of the specification for support). These features are not taught or suggested by the cited references, whether taken alone or in combination.

Based on these differences, it is respectfully submitted that claim 1 is allowable over a Sato-Saito-Arishima combination.

Claims 4 and 8 were rejected under 35 USC § 103(a) for being obvious in view of a Sato-Saito-Arishima-Tada combination. Applicants traverse the rejection of claim 4 on grounds that the Tada patent does not teach or suggest the features added by amendment to claim 1 which are missing from the Sato, Saito, and Arishima patents.

As for claim 8, this claim depends from claim 6 which was not rejected on the combination mentioned above. Nevertheless, Applicants submit that claim 6 is allowable over the cited combination based on the amendments presented in this paper, and that therefore claim 8 is allowable at least by virtue of its dependency from claim 6.

Claim 5 is allowable at least by virtue of its dependency from claim 1, i.e., the Molner and Kanehira patents do not teach or suggest the features added by amendment to claim 1.

Claims 6, 9, and 10 were rejected for being obvious in view of a Sato-Saito-Arishima-Nishina combination. Applicants traverse the rejection of claim 6 on grounds that these references do not teach or suggest the features added by amendment to this claim.
That is, the cited references do not individually or collectively teach or suggest:

(1) a memory storing position information including addresses for a corresponding number of start parts of a plurality of broadcast programs recorded on the recording medium, the plurality of broadcast programs including the first and second broadcast programs;

(2) if the detection unit detects that the second broadcast program has started during the recording operation for the first broadcast program, the control unit controls the memory to store position information including the address corresponding to the start part of the second broadcast program being recorded on the recording medium, the control unit further:

(3) searching the memory for the position information including the address corresponding to the start part of the second broadcast program that is being recorded on the recording medium, and

(4) producing the second broadcast program from the address corresponding to the start part of second broadcast program with reference to the searched position information.

Based on these differences, it is submitted that claim 6 and its dependent claims including claims 9 and 10 are allowable.

The remaining rejections are traversed on grounds that the secondary references do not teach or suggest the features added by amendment to base claims 1 and 6.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.
To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y. J. Kim
Registration No. 36,186

Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 221200
Chantilly, Virginia 20153-1200
(703) 766-3777 DYE/SWN/krf
Date: February 9, 2011
Please direct all correspondence to Customer Number 34610
# Electronic Patent Application Fee Transmittal

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**Title of Invention:** Apparatus and method for searching start position of broadcasting program

**First Named Inventor/Applicant Name:** Dong Chul Chung

**Filer:** Samuel Wade Ntiros/Kim Flanagan

**Attorney Docket Number:** LT-0097

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

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## Payment information:

- Submitted with Payment: yes
- Payment Type: Credit Card
- Payment was successfully received in RAM: $810
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- Deposit Account: 
- Authorized User: 

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
### Patent Application Fee Determination Record

**Application or Docket Number:** 11/337,813

**Filing Date:** 01/24/2006

**To be Mailed**

#### Application asFiled – PART I

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(37 CFR 1.16(i))

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(37 CFR 1.16(h))

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**Application Size Fee**

(37 CFR 1.16(a))

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(g).

**TOTAL**


#### Application as Amended – PART II

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**TOTAL ADD'L FEE**


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* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" in this space is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" in this space is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
/DIANE WILLIAMS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
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<td>4287</td>
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34610 7590 01/18/2011
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Interview Summary

Application No. 11/337,813
Applicant(s) CHUNG, DONG CHUL
Examiner SYED Y. HASAN
Art Unit 2484

All participants (applicant, applicant's representative, PTO personnel):

(1) SYED Y. HASAN
(2) THAI TRAN
(3) SAMUEL NTIROS
(4) ___________

Date of Interview: 06 January 2011.

Type: a) ☑ Telephonic b) __ Video Conference
c) __ Personal [copy given to: 1) ☑ applicant 2) ☐ applicant’s representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☑ No.
If Yes, brief description: ________.

Claim(s) discussed: 1.

Identification of prior art discussed: YES, SATO (US 7046913), SAITO ET AL (US 6775085) AND ARISHIMA ET AL (US 7433579).

Agreement with respect to the claims f) ☑ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Attorney presented a preliminary amendment to claim 1. Revised claim 1 emphasized a memory and storing addresses in memory which was not previously emphasized. The revised claim 1 amendments seems to be supported by the specification. Examiner will have to perform a new search for prior art when the revised amendments are received.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04.) If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484
Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR § 1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.
It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recording of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of the arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.
Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Office Action Summary

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<td>CHUNG, DONG CHUL</td>
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<th>Art Unit</th>
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<tr>
<td>SYED Y. HASAN</td>
<td>2484</td>
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☑ Responsive to communication(s) filed on 12 February 2010.
2a) ☑ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☑ Claim(s) 1, 4, 5, 6 and 8 - 12 is/are pending in the application.
   4a) Of the above claim(s) ☐ is/are withdrawn from consideration.
5) ☐ Claim(s) ☐ is/are allowed.
6) ☑ Claim(s) 1, 4, 5, 6 and 8 - 12 is/are rejected.
7) ☐ Claim(s) ☐ is/are objected to.
8) ☐ Claim(s) ☐ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on ☐ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☑ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☑ All  b) ☐ Some  c) ☐ None of:
   1. ☑ Certified copies of the priority documents have been received.
   2. ☑ Certified copies of the priority documents have been received in Application No. ☐.
   3. ☑ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson’s Patent Drawing Review (PTO-948)
3) ☑ Information Disclosure Statement(s) (PTO/SD/08)
   Paper No(s)/Mail Date ☐.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date ☐.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ☐.
DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 4, 5, 6 and 8 - 12 filed on 02/12/2010 have been considered but are moot in view of the new ground(s) of rejection.

Since claims 1, 4, 5, 6 and 9 have been amended, claims 2, 3 and 7 have been cancelled and new claims 11 and 12 have been added, examiner is responding to all these claims as noted below.

Claim Objections

2. Claim 12 is objected to because of the following informality:

(1) Claim 12 should be changed from “according to claim 1” to “according to claim 6”. Claim 12 is an apparatus claim whereas claim 1 is a method claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 7046913) in view of Saito et al (US 6775085) and further in view of Arishima et al (US 7433579)

Regarding **claim 1**, Sato discloses a method for searching a start position of a broadcast program, comprising:

when a second broadcast program starts during a recording operation performed for recording a first broadcast program (col 1, lines 44 – 48, illustrate first and second broadcast) in on a recording medium (fig 1, 15, col 2, lines 44 – 47, recording medium) storing position information corresponding to a start part of the second broadcast program in a memory (col 1, lines 55 – 57, “a controller having recording management information which is created by extracting a broadcast program to be recorded from the decoded EPG data “ illustrates a storing information, and col 1, lines 59 – 61, “wherein the controller compares the current time with a broadcast program start time contained in the EPG data” illustrates storing start time in a medium, and finally col 5, lines 51 to col 6, line 5, “A computer program, stored in a tangible storage medium, for use in broadcast program recording, the computer program comprising executable instructions that cause a computer to: receive a current broadcast program including broadcast program information; decode the received broadcast program information to output EPG data, which includes a current time and a broadcast program start time” illustrates a tangible storage medium in a computer hence a memory)

wherein the position information corresponding to the start part of the second broadcast program is stored separately from position information corresponding to the
first broadcast program and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video (col 1, lines 59 – 61, the controller compares the current time with a broadcast program start time contained in the EPG data)

searching the memory for the position information which corresponds to the a start part of the second broadcast program being recorded in the recording medium (col 1, lines 59 – 61, “wherein the controller compares the current time with a broadcast program start time contained in the EPG data” and col 2, lines 63 – 66, “In this state, a broadcast program start time (‘07:00” in the embodiment) to be compared is extracted from the broadcast program information of the EPG and is compared with the current time (step ST12)”, illustrates searching for start part)

However Sato does not disclose reproducing the second broadcast program from the start part indicated by the position information stored in the memory and said searching and reproducing being performed before the recording operation has ended

On the other hand Saito et al teaches reproducing the second broadcast program from the start part indicated by the position information stored in the memory (col 1, lines 14 – 31)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate reproducing the second broadcast program from the start part indicated by the position information stored in the memory as taught by Saito et al in the system of Sato in order to efficiently search the start position of each program.
The combination of Sato and Saito et al do not disclose searching and reproducing being performed before the recording operation has ended.

On the other hand Arishima teaches searching and reproducing being performed before the recording operation has ended (col 10, line 54 to col 11, line 2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate searching and reproducing being performed before the recording operation has ended as taught by Arishima in the combined system of Sato and Saito et al in order to efficiently perform recording and reproducing simultaneously.

5. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 7046913) in view of Saito et al (US 6775085) in view of Arishima et al (US 7433579) and further in view of Tada (US 7286744)

Regarding claim 4, Sato, Saito et al and Arishima disclose the method including the first and second broadcast programs (see claim 1 above) except wherein position information is divided and stored for each of a plurality of broadcast programs.

On the other hand Tada teaches wherein position information is divided and stored for each of a plurality of broadcast programs (col 5, lines 8 – 10 illustrate programs being recorded and lines 30 – 37 illustrate position information being divided and stored)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein position information is divided and stored for each of a plurality of broadcast programs as taught by Tada in the combined system of Sato, Saito et al and Arishima in order to record information in allocated areas.
Claim 8 is rejected based on claim 4 above.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 7046913) in view of Saito et al (US 6775085) in view of Arishima et al (US 7433579) and further in view of Molner et al (US 5166886) and further in view of Kanehira (US 7246332)

Regarding claim 5, Sato, Saito et al and Arishima disclose the method (see claim 1 above) except further comprising, if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program.

On the other hand, Molnar et al teaches if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program (col 4, lines 23 – 43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate if a position at which data of the second broadcast program is recorded is identical to position information of a third broadcast program previously stored in the memory, deleting the position information of the third broadcast program as taught by Molner et al in the combined system of Sato, Saito et al and Arishima et al in order to selectively add new material to the material stored in memory.

The combination of Sato, Saito et al, Arishima and Molnar et al do not discloses
overwriting it with at least one of information or data corresponding to the second broadcast program.

On the other hand Kanehira teaches overwriting it with at least one of information or data corresponding to the second broadcast program (col 8, lines 38 – 59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate overwriting it with at least one of information or data corresponding to the second broadcast program as taught by Kanehira in the combined system of Sato, Saito et al, Arishima and Molnar et al in order to generate free area for future recording.

7. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 7046913) in view of Saito et al (US 6775085) in view of Arishima et al (US 7433579) and further in view of Nishina et al (US 6957386).

Regarding claim 6, Sato, Saito et al and Arishima disclose an apparatus for searching a start position of a broadcast program including all of the limitations as described in claim 1 above except for a signal processor outputting a received broadcast program as audio and video.

However Nishina et al teaches a signal processor outputting a received broadcast program as audio and video (fig 1, 3 audio, 4 video).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a signal processor outputting a received broadcast program as audio and video as taught by Nishina et al in the combined system of Sato, Saito et al and Arishima in order to effectively search for the start position.
Regarding **claim 10**, Sato et al disclose the apparatus, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts (fig 1, 11 - 15, col 2, lines 35 - 45, illustrates a tuner and a recording apparatus that functions as TV and set top box).

**Claim 9** is rejected based on claim 5 above.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 7046913) in view of Saito et al (US 6775085) in view of Arishima et al (US 7433579) and further in view of Campbell et al (US 4536791)

Regarding **claim 11**, Sato, Saito et al and Arishima disclose a method (see claim 1 above) except for wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

However Campbell et al teaches wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time as taught by Campbell et al in the combined system of Sato, Saito et al and Arishima in order to determine selecting a given channel and provide access to that channel.

Regarding claim 12, Sato, Saito et al, Arishima and Nishina et al disclose a method (see claim 1 above) except for wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

However Campbell et al teaches wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time (col 14, line 67 to col 15, line 15)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time as taught by Campbell et al in the combined system of Sato, Saito et al, Arishima and Nishina et al in order to determine selecting a given channel and provide access to that channel

**Conclusion**

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP
§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed Y. Hasan whose telephone number is 571-270-1082. The examiner can normally be reached on 9/8/5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Thai Tran can be reached on 571-272-7382. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. Y. H./
10/30/2010

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2484
# Notice of References Cited

**Application/Control No.**

11/337,813

**Examiner**

SYED Y. HASAN

**Art Unit**

2484

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In response to the Notice of Non-Compliant Amendment dated January 7, 2010, the claims previously submitted in the Amendment filed on November 18, 2009 were found to be non-compliant as claim 1 did not have a status identifier. Claim 1 has been corrected and is now compliant. As required under 37 C.F.R. §1.121(h), the Claims Section is attached in its entirety at the end of this reply.

Should the Examiner have any questions regarding the above-identified application, the Examiner is invited to contact the undersigned at the telephone number listed below.
Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiros
Registration No. 39,318

Attachment: CLAIMS

P.O. Box 221200
Chantilly, Virginia 20153-1200
703 766-3777 DYK/SWN/ksf
Date: February 12, 2010
Please direct all correspondence to Customer Number 34610
\Fkd\Documents\2031\2031-099\222811.doc
Listing of Claims

1. (Currently Amended) A method for searching a start position of a broadcast program, comprising:

   when a new second broadcast program starts during a recording operation performed for is started while recording a first broadcast program which is received and output as audio and video in on a recording medium, storing position information corresponding to a start part of the new second broadcast program in a memory, wherein the position information corresponding to the start part of the second broadcast program is stored separately from position information corresponding to the first broadcast program and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals; and

   searching and reproducing the memory for the position information which corresponds to the [a]] start part of a current the second broadcast program being recorded in the recording medium with reference to the position information; and

   reproducing the second broadcast program from the start part indicated by the position information stored in the memory, said searching and reproducing being performed before the recording operation has ended.

2-3 (Canceled)
4. (Currently Amended) The method according to claim 1 [[3]], wherein the position information is divided and stored for each of a plurality of broadcast programs including the first and second broadcast programs.

5. (Currently Amended) The method according to claim 1, further comprising:

   if a position at which data of the current second broadcast program is recorded is identical to position information of a different third broadcast program previously stored in the memory, deleting the position information of the different third broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program.

6. (Currently Amended) An apparatus for searching a start position of a broadcast program, comprising:

   a signal processor outputting a received first broadcast program as audio and video;

   a recording unit performing a recording operation for recording the first broadcast program in a recording medium;

   a detection unit detecting whether a new second broadcast program is started during the recording operation, said detecting performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals;
a memory storing position information regarding corresponding to start parts of a plurality of broadcast programs including the first and second broadcast programs; and

a control unit controlling storage of storing the position information which corresponds to regarding the start part of the new second broadcast program in the memory if the new second broadcast program [[is]] has started during said recording operation, and searching for the position information stored in the memory corresponding to the start part of the second broadcast program that is being recorded in the recording medium, and reproducing [[a]] the start part of second a current broadcast program recorded in the recording medium with reference to the searched position information.

7. (Canceled)

8. (Original) The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.

9. (Currently Amended) The apparatus according to claim 6, wherein, if a position at which data of the current second broadcast program is recorded is identical to position information of a different third broadcast program previously stored in the memory, the control unit deletes the position information of the
different broadcast program and overwrites it with at least one of data or information corresponding to the second broadcast program.

10. (Original) The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

11. (New) The method according to claim 1, wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

12. (New) The apparatus according to claim 1, wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.
# Electronic Acknowledgement Receipt

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Submitted with Payment: no

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
**PATENT APPLICATION FEE DETERMINATION RECORD**
Substitute for Form PTO-875

**APPLICATION AS FILED – PART I**

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| Independent (37 CFR 1.16 iterative) | | | | | | |
| Application Size Fee (37 CFR 1.16 iterative) | | | | | | |
| TOTAL ADD'L FEE | | | |

*If the entry in column 1 is less than the entry in column 2, write "0" in column 3.*

"**" If the "Highest Number Previously Paid For" in this space is less than 20, enter "20".

"***" If the "Highest Number Previously Paid For" in this space is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner: JOSEPHINE DOUGLAS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
**PATENT APPLICATION FEE DETERMINATION RECORD**

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**LEGAL INSTRUMENT EXAMINER:**

*FELICIA JENKINS/

---

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
**Application No.:** 11/337,813  
**Date Mailed:** 01/07/2010

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<th>Chung, Dong, Chul</th>
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<th>HASAN, SYED Y</th>
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Please find attached an Office communication concerning this application or proceeding.

Commissioner for Patents
Notice of Non-Compliant Amendment
(37 CFR 1.121)

--- The MAILING DATE of this communication appears on the cover sheet with the correspondence address ---

The amendment document filed on **18 November, 2009** is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- **1. Amendments to the specification:**
  - [x] A. Amended paragraph(s) do not include markings.
  - [ ] B. New paragraph(s) should not be underlined.
  - [ ] C. Other ______.

- **2. Abstract:**
  - [ ] A. Not presented on a separate sheet. 37 CFR 1.72.
  - [ ] B. Other ______.

- **3. Amendments to the drawings:**
  - [x] A. The drawings are not properly identified in the top margin as “Replacement Sheet,” “New Sheet,” or “Annotated Sheet” as required by 37 CFR 1.121(d).
  - [ ] B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - [ ] C. Other ______.

- **4. Amendments to the claims:**
  - [x] A. A complete listing of all of the claims is not present.
  - [ ] B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - [x] C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - [ ] D. The claims of this amendment paper have not been presented in ascending numerical order.
  - [x] E. Other: **Claim 1 doesn't have a status identifier**

- **5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4):** For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period** if the non-compliant amendment is an after-final amendment or an amendment filed after allowance, or a drawing submission (only) If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the entire corrected amendment must be resubmitted.

2. Applicant is given **one month**, or thirty (30) days, whichever is longer, from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a Quayle action. If any of above boxes 1 to 4 are checked, the correction required is only the corrected section of the non-compliant amendment in compliance with 37 CFR 1.121.

**Extensions of time** are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a Quayle action.

**Failure to timely respond** to this notice will result in:
- **Abandonment** of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a Quayle action; or
- **Non-entry** of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

Legal Instruments Examiner (LIE), if applicable /FELICIA JENKINS/ Telephone No: (571)272-0986
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Dong Chul CHUNG
Serial No: 11/337,813 Filed: January 24, 2006

Confirmation No: 4287
Group Art Unit: 2621
Examiner: Syed Y. HASAN
Customer No: 34610

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

AMENDMENT

U.S. Patent and Trademark Office
Customer Window, Mail Stop Amendment
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

The following amendments and remarks are submitted in reply to the Office Action mailed on August 19, 2009, in connection with the above-identified application.

Amendments to the Claims are in the Listing of Claims beginning on page 2.

Remarks begin on page 6.
Listing of Claims

1. A method for searching a start position of a broadcast program, comprising:
   
   when a new second broadcast program starts during a recording operation performed for is started while recording a first broadcast program which is received and output as audio and video in on a recording medium, storing position information regarding corresponding to a start part of the new second broadcast program in a memory, wherein the position information corresponding to the start part of the second broadcast program is stored separately from position information corresponding to the first broadcast program and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals; and

   searching and reproducing the memory for the position information which corresponds to the [[a]] start part of a current the second broadcast program being recorded in the recording medium with reference to the position information; and

   reproducing the second broadcast program from the start part indicated by the position information stored in the memory, said searching and reproducing being performed before the recording operation has ended.

2-3 (Canceled)
4. (Currently Amended) The method according to claim 1 [[3]], wherein the position information is divided and stored for each of a plurality of broadcast programs including the first and second broadcast programs.

5. (Currently Amended) The method according to claim 1, further comprising:
   if a position at which data of the current second broadcast program is recorded is identical to position information of a different third broadcast program previously stored in the memory, deleting the position information of the different third broadcast program and overwriting it with at least one of information or data corresponding to the second broadcast program.

6. (Currently Amended) An apparatus for searching a start position of a broadcast program, comprising:

   a signal processor outputting a received first broadcast program as audio and video;

   a recording unit performing a recording operation for recording the first broadcast program in a recording medium;

   a detection unit detecting whether a new second broadcast program is started during the recording operation, said detecting performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals;
a memory storing position information regarding corresponding to start parts of a plurality of broadcast programs including the first and second broadcast programs; and

a control unit controlling storage of storing the position information which corresponds to regarding the start part of the new second broadcast program in the memory if the new second broadcast program [[is]] has started during said recording operation, and searching for the position information stored in the memory corresponding to the start part of the second broadcast program that is being recorded in the recording medium, and reproducing [][a] the start part of second a current broadcast program recorded in the recording medium with reference to the searched position information.

7. (Canceled)

8. (Original) The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.

9. (Currently Amended) The apparatus according to claim 6, wherein, if a position at which data of the current second broadcast program is recorded is identical to position information of a different third broadcast program previously stored in the memory, the control unit deletes the position information of the different broadcast program and overwrites it with at least one of data or information corresponding to the second broadcast program.
10. (Original) The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.

11. (New) The method according to claim 1, wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.

12. (New) The apparatus according to claim 1, wherein a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time.
REMARKS

Claims 1-12 are pending.

In the Office Action, claim 1 was rejected under 35 USC § 112, second paragraph, on grounds that unclear language was used to identify each of the programs recited in this claim. Claim 1 has been amended to clarify these features with the replacement phrases, “first broadcast program” and “second broadcast program.” Withdrawal of the § 112 rejection is respectfully requested.

Claims 1 and 2 were rejected under 35 USC § 103(a) for being obvious in view of a Saito-Nishina combination. Applicants request the Examiner to withdraw this rejection for the following reasons.

The Saito publication discloses a video recorder which is programmed by a user to begin recording a television show. (See Paragraph [34]).

The Nishina patent discloses use of an electronic program guide to record television programs.

However, neither reference teaches or suggests the features added by amendment to claim 1. That is, Saito and Nishina do not teach or suggest that when a second broadcast program starts during a recording operation performed for recording a first broadcast program on a recording medium, storing position information corresponding to a start part of the second broadcast program in a memory.

Claim 1 further recites that the position information corresponding to the start part of the second broadcast program is stored separately from position information corresponding to the
first broadcast program and wherein a determination of whether the second broadcast program has started is performed based on Electronic Program Guide (EPG) information or a change in at least one of audio or video signals.

In addition, claim 1 recites searching the memory for the position information which corresponds to the start part of the second broadcast program being recorded in the recording medium, and reproducing the second broadcast program from the start part indicated by the position information stored in the memory, said searching and reproducing being performed before the recording operation has ended.

The Saito publication and the Nishina patent do not teach or suggest all of these features, whether taken alone or in combination. Withdrawal of the rejection of claim 1 is respectfully requested.

Claims 3, 6, 7, and 10 were rejected for being obvious in view of a Saito-Nishina-Hashimoto combination, claims 4 and 8 were rejected for being obvious in view of a Saito-Nishina-Hashimoto-Tada combination, claim 5 was rejected based on a Saito-Nishina-Molner combination, and claim 9 was rejected based on a Saito-Nishina-Hashimoto-Molner combination. Applicants traverse these rejections on grounds that claim 6 has been amended to recite features similar to those which patentably distinguish claim 1 and on grounds that none of the secondary references of record teach or suggest the distinguishing features of claims 1 and 6 missing from the Saito publication and the Nishina patent.
New claims 11 and 12 have been added to recite additional distinguishing features. Each of these claims recites that a change in audio and video signals provides an indication that a video period of a substantially black screen and an audio period of substantially no sound are simultaneously detected for a predetermined time. These features are not taught or suggested by the cited references, whether taken alone or in combination.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y. J. Kim
Registration No. 36,186

Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 221200
Chantilly, Virginia 20153-1200
(703) 766-3777 DYK/SWN/krf
Date: November 18, 2009

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Dong Chul CHUNG

Confirmation No.: 4287

Group Art Unit: 2621

Examiner: Syed Y. HASAN

Serial No: 11/337,813

Customer No.: 34610

Filed: January 24, 2006

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

U.S. Patent and Trademark Office
Customer Window, Mail Stop Amendment
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Dear Sir:
Transmitted herewith is an Amendment and/or Reply in the above identified application.

☑ No additional fee is required.
Also attached:

The fee has been calculated as shown below:

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If multiple claims newly presented, add $390.00

Fee for extension of time

TOTAL FEE DUE

☑ The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 16-0607, including any filing fees under 37 C.F.R. 1.16 for presentation of extra claims and any patent application processing fees under 37 C.F.R. 1.17.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiros
Registration No. 39,318

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
(703) 766-3777 DYK/SWN/krf
Date: November 18, 2009

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34610  7890  08/19/2009
KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, VA 20153-1200

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.
Office Action Summary

Application No. 11/337,813
Applicant(s) CHUNG, DONG CHUL

Examiner SYED Y. HASAN
Art Unit 2621

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☑️ Responsive to communication(s) filed on 24 January 2006.
2a) ☐ This action is FINAL.
2b) ☑️ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☑️ Claim(s) 1 - 10 is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☑️ Claim(s) 1 - 10 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☑️ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☑️ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☑️ All
   b) ☐ Some * c) ☐ None of:
      1. ☑️ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑️ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson’s Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.
DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

    The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

    Claim 1 specifies “new broadcast”, “a broadcast” and “current broadcast”. This claim refers to “a new broadcast is started”, “recording a broadcast program” and “searching and reproducing a start part of a current broadcast”. It is not clear from the claim whether it is one broadcast or two different broadcasts. In the absence of a clear claim language examiner interprets new broadcast as a new broadcast that is storing position of start part and being received and output as audio and video in a recording medium. Current broadcast is the second broadcast which has been previously recorded and is being searched and reproduced for a start part. If applicant does not agree to this interpretation then the claim language needs to clarify this interpretation.

    Claims 2 – 5 are dependent on claim 1, therefore they are also rejected.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

    (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person
having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0109930) in view of Nishina et al (US 6957386)

Regarding claim 1, Saito et al discloses a method for searching a start position of a broadcast program, comprising:

searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information (para 0004)

However Saito does not disclose when a new broadcast program is started while recording a broadcast program which is received and output as audio and video in a recording medium, storing position information regarding a start part of the new broadcast program

On the other hand Nishina et al teaches when a new broadcast program is started while recording a broadcast program which is received and output as audio and video in a recording medium, storing position information regarding a start part of the new broadcast program (col 17, line 53 – col 18, line 26)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate when a new broadcast program is started while recording a broadcast program which is received and output as audio and video in a recording medium, storing position information regarding a start part of the new broadcast program as taught by Nishina et al in the system of Saito et al in order to search for the start position.
Regarding **claim 2**, Saito et al discloses the method (see claim 1 above) except, wherein a determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals.

On the other hand Nishina et al teaches wherein a determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals (col 7, lines 6 – 11, col 9, lines 48 – 59, col 14, lines 36 – 44, illustrates program started done on the basis of EPG)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals as taught by Nishina et al in the system of Saito et al in order to search for the start position.

5. Claims 3, 6, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0109930) in view of Nishina et al (US 6957386) and further in view of Hashimoto et al (US 2003/0215216)

Regarding **claim 3**, Saito et al and Nishina et al disclose the method (see claim 1 above) except wherein the position information is stored in a memory, separately from the recording medium

On the other hand Hashimoto et al teaches wherein the position information is stored in a memory, separately from the recording medium (para 0098)
It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the position information is stored in a memory, separately from the recording medium as taught by Hashimoto et al in the combined system of Saito et al and Nishina et al in order to record information in a separate area.

Regarding **claim 6**, Saito et al discloses an apparatus for searching a start position of a broadcast program (see claim 1 above) comprising:

However Saito et al does not disclose a signal processor outputting a received broadcast program as audio and video; a recording unit recording the broadcast program in a recording medium; a detection unit detecting whether a new broadcast program is started; and a control unit storing the position information regarding the start part of the new broadcast program in the memory if the new broadcast program is started, and searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information.

On the other hand Nishina et al teaches a signal processor outputting a received broadcast program as audio and video (fig 1, 3 audio, 4 video); a recording unit recording the broadcast program in a recording medium (fig 1, 11 VTR); a detection unit detecting whether a new broadcast program is started (fig 1, 7, tuner/timer controller, col 5, line 63 to col 6, line 4) and a control unit storing the position information regarding the start part of the new broadcast program if the new broadcast program is started, and searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information. (col 17, line 53 – col 18, line 26)
It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a signal processor outputting a received broadcast program as audio and video; a recording unit recording the broadcast program in a recording medium; a detection unit detecting whether a new broadcast program is started; and a control unit storing the position information regarding the start part of the new broadcast program in the memory if the new broadcast program is started, and searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information as taught by Nishina et al in the system of Saito et al in order to search for the start position.

The combination of Saito et al and Nishina et al do not disclose a memory storing position information regarding start parts of broadcast programs.

On the other hand Hashimoto et al teaches a memory storing position information regarding start parts of broadcast programs (para 0098).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a memory storing position information regarding start parts of broadcast programs as taught by Hashimoto et al in the combined system of Saito et al and Nishina et al in order to record information in a separate area.

Regarding claim 10, Saito et al discloses the apparatus, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts (fig 1, 100, para 0009, illustrates hard disk recorder that functions as set top box).

Claim 7 is rejected based on claim 2 above.
6. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0109930) in view of Nishina et al (US 6957386) in view of Hashimoto et al (US 2003/0215216) and further in view of Tada (US 7286744)

Regarding claim 4, Saito et al, Nishina et al and Hashimoto et al disclose the method (see claim 1 above) except wherein the position information is divided and stored for each broadcast program.

On the other hand Tada teaches wherein the position information is divided and stored for each broadcast program (col 5, lines 30 – 37)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the position information is divided and stored for each broadcast program as taught by Tada in the combined system of Saito et al, Nishina et and Hashimoto et al in order to record information in allocated areas.

Claim 8 is rejected based on claim 4 above.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0109930) in view of Nishina et al (US 6957386) and further in view of Molner et al (US 5166886)

Regarding claim 5, Saito et al and Nishina et al disclose the method (see claim 1 above) except further comprising, if a position at which data of the current broadcast program is recorded is identical to position information of a different broadcast program stored in the memory, deleting the position information of the different broadcast program.

On the other hand Molnar et al teaches if a position at which data of the current
broadcast program is recorded is identical to position information of a different
broadcast program stored in the memory, deleting the position information of the
different broadcast program (col 4, lines 23 – 43)

It would have been obvious to one of ordinary skill in the art at the time of the
invention to incorporate if a position at which data of the current broadcast program is
recorded is identical to position information of a different broadcast program stored in
the memory, deleting the position information of the different broadcast program as
taught by Molner et al in the combined system of Saito et al and Nishina et al in order
to selectively add new material to the material stored in memory.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al
(US 2002/0109930) in view of Nishina et al (US 6957386) in view of Hashimoto et al
(US 2003/0215216) and further in view of Molner et al (US 5166886)

Regarding **claim 9**, Saito et al, Nishina et al and Hashimoto et al disclose the
method (see claim 1 above) except wherein, if a position at which data of the current
broadcast program is recorded is identical to position information of a different
broadcast program stored in the memory, the control unit deletes the position
information of the different broadcast program

On the other hand Molnar et al teaches wherein, if a position at which data of
the current broadcast program is recorded is identical to position information
of a different broadcast program stored in the memory, the control unit deletes
the position information of the different broadcast program (col 4, lines 23 – 43)

It would have been obvious to one of ordinary skill in the art at the time of the
invention to wherein, if a position at which data of the current broadcast program is recorded is identical to position information of a different broadcast program stored in the memory, the control unit deletes the position information of the different broadcast programs taught by Molner et al. in the combined system of Saito et al., Nishina et al, and Hashimoto et al in order to selectively add new material to the material stored in memory.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed Y. Hasan whose telephone number is 571-270-1082. The examiner can normally be reached on 9/8/5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Thai Tran can be reached on 571-272-7382. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. Y. H./
08/12/2009

/Thai Tran/
Supervisory Patent Examiner, Art Unit 2621
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U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)
BIB DATA SHEET

** CONTINUING DATA ******************

** FOREIGN APPLICATIONS ******************
REPUBLIC OF KOREA 10-2005-0006331 01/24/2005

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **

02/28/2006

Address
KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, VA 20153-1200
UNITED STATES

TITLE
Apparatus and method for searching start position of broadcasting program

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1130

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- All Fees
- 1.16 Fees (Filing)
- 1.17 Fees (Processing Ext. of time)
- 1.18 Fees (Issue)
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- Credit
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NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given TWO MONTHS from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing. Applicant must submit $300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).

- The oath or declaration is missing. A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required. Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $1130 for a Large Entity:

- $300 Statutory basic filing fee.
- $130 Surcharge.
• The application search fee has not been paid. Applicant must submit $500 to complete the search fee.
• The application examination fee has not been paid. Applicant must submit $200 to complete the examination fee for a large entity

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 2 - COPY TO BE RETURNED WITH RESPONSE
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Dong Chul CHUNG
Serial No.: 11/337,813
Filed: January 24, 2006
For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

CONFIRMATION NO.: 4287
Group Art Unit: 2615
Examiner: To Be Assigned
Customer No.: 34610

REPLY TO NOTICE TO FILE MISSING PARTS OF APPLICATION

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP MISSING PARTS
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

In reply to the Notice of Missing Parts of Application dated , submitted herewith are the following documents for filing in the above-referenced application:

☒ Declaration and Power of Attorney;
☒ Filing Fee of $1,000.00;
☒ Late filing surcharge of $130.00 (large entity) ☒ $65.00 (small entity);
☒ Transmittal of certified priority document;
☒ A check in the amount of $1,130.00 (Check #17513) is enclosed;
☒ Assignment Recodration Coversheet and Assignment; and
☒ A check in the amount of $40.00 (Check #17514), representing the recodration fee for the Assignment is enclosed.

It is requested that an Official Filing Receipt showing the data contained herewith now be issued.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
FLESHNER & KIM, LLP

Daniel Y.J. Kim
Registration No. 36,186

P.O. Box 221200
Chantilly, VA 20153-1200
(703) 766-3701 DYS/dak
Date: April 27, 2006

Please direct all correspondence to Customer Number 34610
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Dong Chul CHUNG

Confirmation No.: 4287

Group Art Unit: 2615

Examiner: To Be Assigned

Serial No.: 11/337,813

Customer No.: 34610

Filed: January 24, 2006

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

AUTHORIZATION TO TREAT A REPLY AS INCORPORATING AN EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)(3)

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP MISSING PARTS
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

The U.S. Patent and Trademark Office is hereby authorized to treat any concurrent or future reply that requires a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time under 37 C.F.R. 1.136(a)(3). The U.S. Patent and Trademark Office is hereby authorized to charge all required extension of time fees to our Deposit Account No. 16-0607, if such fees are not otherwise provided for in such reply. A duplicate copy of this sheet is enclosed.

Respectfully submitted,
FLESCHNER & KIM, LLP

Daniel Y.J. Kim
Registration No. 36,186

P.O. Box 221200
Chantilly, Virginia 20153-1200
703 766-3701 dyk/dak
Date: April 27, 2006

Please direct all correspondence to Customer Number 34610
DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought on the invention embodied APPARATUS AND METHOD FOR SEARCHING START POSITION OF

□ is attached hereto ☒ was filed on January 24, 2006, as Application Serial No. 11/337,611 and was amended on _______________ (if applicable)

I hereby state that I have reviewed and understood the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with 37 C.F.R. 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365 (b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s):
Number Country Filing Date (Month/Day/Year)
10-2005-0006331 Korea January 24, 2005

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s): Filing Date (Month/Day/Year)

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT International application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 118, I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Prior U.S. Application or PCT Parent Number Filing Date (Month/Day/Year) Parent Patent Number (if applicable)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application on any patent issued thereon.

I hereby appoint the attorney(s) and/or agent(s) associated with Customer Number 34610 to prosecute this application and transact all business in the Patent and Trademark Office.

Direct all correspondence to Customer Number 34610
Authorization to treat a reply as incorporating an extension of time under 37 C.F.R. §1.136(a)(3)

U.S. Patent and Trademark Office
Customer Service Window, Mail Stop Missing Parts
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

The U.S. Patent and Trademark Office is hereby authorized to treat any concurrent or future reply that requires a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time under 37 C.F.R. 1.136(a)(3). The U.S. Patent and Trademark Office is hereby authorized to charge all required extension of time fees to our Deposit Account No. 16-0607, if such fees are not otherwise provided for in such reply. A duplicate copy of this sheet is enclosed.

Respectfully submitted,
FLESHNER & KIM, LLP

Daniel Y.J. Kim
Registration No. 36,186

P.O. Box 221200
Chantilly, Virginia 20153-1200
703 766-3701 DvK/dak
Date: April 27, 2006
Please direct all correspondence to Customer Number 34610

\Fk\Documents\2031\2031-099\92608.doc
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Dong Chul CHUNG

Confirmation No.: 4287

Group Art Unit: 2615

Serial No.: 11/337,813

Examiner: To Be Assigned

Filed: January 24, 2006

Customer No.: 34610

For: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

TRANSMITTAL OF CERTIFIED PRIORITY DOCUMENT

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP MISSING PARTS
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

At the time the above application was filed, priority was claimed based on the following application:


A copy of the priority application listed above is enclosed.

Respectfully submitted,
FLESHNER & KIM, LLP

Daniel Y.J. Kim
Registration No. 36,186

P.O. Box 221200
Chantilly, Virginia 20153-1200
703 766-3701 dyk/dsk
Date: April 27, 2006
Please direct all correspondence to Customer Number 34610
This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

Application Number: 10-2005-0006331
Date of Application: 2005년 01월 24일 (JAN 24, 2005)
Applicant(s): 주식회사 휴맥스

2005년 12월 27일

COMMISSIONER

◆ This certificate was issued by Korean Intellectual Property Office. Please confirm any forgery or alteration of the contents by an issue number or a barcode of the document below through the KIPOnet- Online Issue of the Certificates' menu of Korean Intellectual Property Office homepage (www.kipo.go.kr). But please notice that the confirmation by the issue number is available only for 90 days.
【서지사항】

【서류명】 특허출원서
【권리구분】 특허
【수신처】 특허청장
【참조번호】 0004
【제출일자】 2005.01.24
【발명의 국문명칭】 방송 프로그램의 시작 위치 서치 장치 및 방법
【발명의 영문명칭】 Apparatus and method for searching start position of broadcasting program

【출원인】

【명칭】 주식회사 휴맥스
【출원인코드】 1-1998-000063-1

【대리인】

【성명】 박래봉
【대리인코드】 9-1998-000250-7
【포괄위임등록번호】 2001-062813-4

【발명자】

【성명의 국문표기】 정동철
【성명의 영문표기】 CHUNG, Dong Chul
【주민등록번호】 730220-1243523
【우편번호】 151-849
【주소】 서울특별시 관악구 봉천동 1684-29번지
【국적】 KR
【심사청구】 청구
【취지】 특허법 제42조의 규정에 의한 출원, 특허법 제60조의 규정에 의한 출원심사 를 청구합니다.

대리인 박래봉 (인)
【수수료】
【기본출원료】 0 면 38,000 원
【가산출원료】 20 면 0 원
【우선권주장료】 0 건 0 원
【심사청구료】 7 항 333,000 원
【합계】 371,000 원
【감면사유】 중소기업
【감면후 수수료】 185,500 원
【첨부서류】 1.중소기업기본법시행령 제2조에의한 중소기업에 해당함을 증명하는 서류_1통
【요약서】

【요약】

본 발명은, 방송 프로그램의 시각 위치 서치 장치 및 방법에 관한 것으로, 예를 들어, 피브리알(PVR) 기능이 구비된 셋탑 박스와 같은 디지털 방송 수신기에 서, 실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하면서, 하드 디스크(HDD)와 같은 기록매체에 기록함과 아울러, 새로운 방송 프로그램의 시 작 부분을 기록하게 되는 경우, 그 기록위치 정보를 메모리 등에 구분 기록하고, 또한 상기 기록매체에 이미 기록된 데이터를, 새로운 데이터로 갱신 기록하면서, 현재의 기록위치를 확인하여, 상기 구분 저장된 기록위치 정보를 실시간으로 갱신 관리함으로써, 사용자가 방송 프로그램의 시각 위치 서치 동작을 요청하는 경우, 상기 갱신 관리되는 기록위치 정보를 검색 참조하여, 하드 디스크와 같은 기록매체 에 갱신 기록된 방송 프로그램의 시각 부분을 신속하게 탐색 및 재생할 수 있게 되 면, 사용자가 원하는 서치 동작을 정상적으로 수행할 수 있게 되는 매우 유용한 발명인 것이다.

【대표도】

도 5

【색인어】

방송 프로그램 시각 위치, 디지털 방송 수신기, 기록위치 정보, 하드 디스크, 메모리, 서치 동작, 피브리알(PVR) 기능
【명세서】

【발명의 명칭】

방송 프로그램의 시작 위치 서치 장치 및 방법 {Apparatus and method for searching start position of broadcasting program}

【도면의 간단한 설명】

1. 도 1은 일반적인 PVR 기능이 구비된 디지털 방송 수신기에 대한 구성요소를 도시한 것이고,

2. 도 2는 일반적인 PVR 기능이 구비된 디지털 방송 수신기의 하드 디스크에 방송 프로그램들이 기록 관리되는 실시예를 도시한 것이고,

3. 도 3은 본 발명이 적용되는 PVR 기능이 구비된 디지털 방송 수신기에 대한 구성요소를 도시한 것이고,

4. 도 4는 본 발명이 적용되는 PVR 기능이 구비된 디지털 방송 수신기의 하드 디스크에 방송 프로그램들이 기록 관리되는 실시예를 도시한 것이고,

5. 도 5는 본 발명에 따른 방송 프로그램 시작 위치 서치 방법에 대한 동작 흐름도를 도시한 것이다.

※ 도면의 주요부분에 대한 부호의 설명

10,20 : 튜너  11,21 : 신호 처리부
12,22 : MPEG 디코더  13,23 : 마이컴
14,24 : 오에스디 생성부  15,25 : 메모리
16,26 : HDR 시스템  17,27 : 하드 디스크
28 : 프로그램 시작 검출부

【발명의 상세한 설명】

【발명의 목적】

【발명이 속하는 기술분야 및 그 분야의 종래기술】

본 발명은, 방송 프로그램의 시작 위치 서치 장치 및 방법에 관한 것으로, 예를 들어, PVR(Personal Video Record) 기능이 구비된 셋탑 박스(Set Top Box)와 같은 디지털 방송 수신기에서, 하드 디스크(HDD)와 같은 기록매체에 기록되는 방송 프로그램의 시작 부분을, 사용자의 요청에 따라 서치(Search) 및 재생할 수 있도록 하기 위한 방송 프로그램의 시작 위치 서치 장치 및 방법에 관한 것이다.

일반적으로 디지털 방송을 수신하기 위한 셋탑 박스(STB)와 같은 디지털 방송 수신기가 널리 보급되어 사용되고 있으며, 또한 최근에는, 방송 프로그램을 하드 디스크(HDD)와 같은 기록매체에 기록할 수 있는 PVR 기능이 구비된 디지털 방송 수신기가 개발 출시되어 사용되고 있는 것으로 기대되고 있다.

한편, 상기 PVR 기능이 구비된 디지털 방송 수신기에는, 도 1에 도시한 바와 같이, 튜너(10), 신호 처리부(11), MPEG 디코더(12), 마이컴(13), 오에스디 생성부
(14), 메모리(15), HDR(HDD Record) 시스템(16), 그리고 하드 디스크(17) 등이 포함 구성될 수 있다.

또한, 상기 마이컴(13)에서는, 사용자의 요청에 따라, 상기 튜너(10)를 동작 제어하여, 임의의 한 방송 채널을 선정한 후, 상기 신호 처리부(11)와 MPEG 디코더(12)를 동작 제어하여, 상기 방송 채널을 통해 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하게 된다.

그리고, 상기 마이컴(13)에서는, 사용자의 요청에 따라, 상기 HDR 시스템(16)을 동작 제어하여, 실시간으로 수신되고 있는 방송 프로그램을, 상기 하드 디스크(17)에 기록하게 되는 데, 예를 들어 도 2에 도시한 바와 같이, 상기 하드 디스크(HDD)에는, 헤더(Header) 영역과 파일 할당 테이블(FAT: File Allocation Table) 영역, 그리고 데이터 영역(Data Area)이 구분 할당된다.

한편, 상기 마이컴(13)에서는, 상기 하드 디스크의 데이터 영역(Data Area) 에, 제1 내지 제3 프로그램(Program #1~#3)을 순차적으로 기록하는 경우, 그 제1 내지 제3 프로그램에 각각 대응되는 제1 내지 제3 프로그램 정보(Program #1_Info~#3_Info)를 생성하여, 상기 파일 할당 테이블(FAT) 영역 내에 기록 저장하게 되는 데, 상기 제1 내지 제3 프로그램 정보(Program #1_Info~#3_Info)에는, 각 프로그램들이 기록된 시작 어드레스(Add #) 등이 포함 기록된다.

그리고, 상기 마이컴(13)에서는, 사용자가 임의의 한 방송 프로그램, 예를 들어 제3 프로그램(Program #3)에 대한 재생 동작을 요청하게 되면, 그에 대응되는 제3 프로그램 정보(Program #3_Info)에 포함 기록된 시작 어드레스(Add #)를 검색
참조하여, 그 기록위치를 탐색 및 재생하게 된다.

그러나, 일반적인 PVR 기능이 구비된 디지털 방송 수신기에서는, 방송 프로그램은 하드 디스크에 기록하는 일련의 데이터 기록 동작이 종료된 후에, 그에 상응하는 프로그램 정보를 생성하여, 상기 파일 합당 테이블(FAT) 영역에 기록 관리하기 때문에, 실시간으로 수신되는 방송 프로그램을 기록하던 도중, 사용자가, 그 방송 프로그램의 시작 위치에서부터의 서지 재생을 요청하는 경우, 해당 기록위치를 신속하게 서치 및 재생할 수 없는 문제점이 있다.

또한, 상기 디지털 방송 수신기에서는, 데이터 기록 동작을 수행하던 도중, 실시간으로 수신되는 방송 프로그램이 새로운 방송 프로그램으로 변경되더라도, 그 새로운 프로그램의 기록위치를 별도로 관리하지 않고, 상기 데이터 기록 동작을 시작한 기록위치를 관리하기 때문에, 사용자가 현재 시청 중인 방송 프로그램의 시작 기록위치를 신속하게 서치 및 재생할 수 없게 되는 문제점이 있다.

【발명이 이루고자 하는 기술적 과제】

따라서, 본 발명은 상기와 같은 문제점을 해결하기 위하여 창작된 것으로서, 예를 들어 PVR 기능이 구비된 셋탑 박스와 같은 디지털 방송 수신기에서, 실시간으로 수신되는 방송 프로그램을 하드 디스크(HDD)와 같은 기록매체에 기록함과 아울러, 새로운 방송 프로그램의 시작 부분을 기록하게 되는 경우, 그 기록위치 정보를
메모리 등에 구분 기록하고, 상기 기록매체에 이미 기록된 데이터를, 새로운 데이터로 갱신 기록하는 경우, 현재의 기록위치를 확인하여, 상기 구분 저장된 기록위치 정보를 실시간으로 갱신 관리함으로써, 사용자가 시청 중인 방송 프로그램의 시작 위치 서치 동작을 요청하는 경우, 상기 기록위치 정보를 검색 참조하여, 해당 방송 프로그램의 시작 부분을 신속하게 서치 및 재생할 수 있도록 하기 위한 방송 프로그램의 시작 위치 서치 장치 및 방법을 제공하는 데, 그 목적이 있는 것이다.

【발명의 구성】

상기와 같은 목적을 달성하기 위한 본 발명에 따른 방송 프로그램의 시작 위치 서치 방법은, 실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하면서, 기록매체에 기록하는 1단계; 상기 기록매체에 새로운 방송 프로그램의 시작 부분을 기록하는 경우, 그 기록위치 정보를 구분 저장하는 2단계; 상기 기록매체에 이미 기록된 데이터를, 새로운 데이터로 갱신 기록하면서, 현재의 기록위치를 확인하여, 상기 구분 저장된 기록위치 정보를 갱신 관리하는 3단계; 및 상기 기록위치 정보를 검색 참조하여, 상기 기록매체에 갱신 기록된 방송 프로그램의 시작 부분을 탐색 재생하는 4단계를 포함하여 이루어지는 것을 특별으로 하며,

또한, 본 발명에 따른 방송 프로그램의 시작 위치 서치 장치는, 실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하기 위한 신호 처리수단; 상기 방송 프로그램을 기록매체에 기록하기 위한 기록수단; 상기 기록매체에 기록되는 새로운 방송 프로그램의 시작 부분을 검출하기 위한 검출수단; 및 상기 방송
프로그램의 시작 부분이 검출되면, 그 기록위치 정보를 메모리 구분 저장함과 아울러, 실시간으로 데이터가olatile 기록되는 현재의 기록위치가, 상기 구분 저장된 기록위치를 초과하게 되면, 그에 해당하는 기록위치 정보를 삭제 처리하는 제어수단을 포함하여 구성되는 것을 특징으로 한다.

이하, 본 발명에 따른 방송 프로그램의 시작 위치 서치 장치 및 방법에 대한 바람직한 실시예에 대해, 참부른 도면을 참조하여 상세히 설명한다.

우선, 본 발명이 적용되는 PVR 기능이 구비된 셋탑 박스(STB)와 같은 디지털 방송 수신기에는, 도 3에 도시한 바와 같이, 튜너(20), 신호 처리부(21), MPEG 디코더(22), 마이크(23), 오디오 입력(24), 메모리(25), HDR 시스템(26), 그리고 하드 디스크(27) 등이 포함 구성됨과 아울러, 프로그램 시작 검출부(28)가 추가로 포함 구성될 수 있다.

그리고, 상기 프로그램 시작 검출부(28)에서는, 실시간으로 수신되는 방송 프로그램이 새로운 방송 프로그램으로 변경되는 지를 검출하게 되는 데, 예를 들어 상기 프로그램 시작 검출부(28)에서는, 디지털 방송을 통해 부가적으로 제공되는 이피지(EPG:Electronic Program Guide) 정보를 검색 참조하여, 현재 수신되는 방송 프로그램이 새로운 방송 프로그램으로 변경되었는 지를 검출하게 된다.

한편, 다른 실시예로서, 상기 프로그램 시작 검출부(28)에서는, 방송 프로그램 사이에 존재하는 비디오 및 오디오의 변화를 검출할 수도 있는 데, 예를 들어 소정 시간 동안 블랙 스크린(Black Screen)의 비디오 구간과, 노 사운드(No Soun
d)의 오디오 구간이 동시에 검출되는 경우, 실시간으로 수신되는 방송 프로그램이 새로운 방송 프로그램으로 변경되었다고 점출하게 된다.

또한, 상기 마이컴(23)에서는, 사용자의 요청에 따라, 상기 튜너(20)를 동작 제어하여, 임의의 한 방송 채널을 선정한 후, 상기 신호 처리부(21)와 MPEG 디코더(22)를 동작 제어하여, 상기 방송 채널을 통해 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하게 된다.

그리고, 상기 HDR 시스템(26)을 동작 제어하여, 실시간으로 수신되고 있는 방송 프로그램을, 상기 하드 디스크(27)에 기록하게 되는 데, 예를 들어 도 4에 도시한 바와 같이, 상기 마이컴(23)에서는, 상기 하드 디스크(HDD)의 데이터 영역(Data Area)에, 제1 내지 제3 프로그램(Program #1~#3)이 기록된 상태에서, 새로운 방송 프로그램을 기록하는 경우, 상기 제1 내지 제3 프로그램에 대한 시작 기록 위치 정보(Program #1_SA~#3_SA)와 함께, 현재 기록되는 제4 프로그램의 시작 기록 위치 정보(Program #4_SA)를, 상기 메모리(25)로 구분 기록하게 된다.

한편, 상기 프로그램 시작 검출부(28)에 의해 새로운 방송 프로그램, 예를 들어 제5 프로그램이 변경 수신되다고 점출하게 되는 경우, 상기 마이컴(23)에서는, 제5 프로그램의 시작 기록 위치 정보(Program #5_SA)를, 상기 메모리(25)에 기록 저장하게 되며, 이후 도 4에 도시한 바와 같이, 제1 프로그램이 기록된 데이터 구간에, 제5 프로그램을 채신 기록(Overwriting)하게 되면, 상기 제1 프로그램의 시작 기록 위치 정보(Program #1_SA)를 실시간으로 삭제 처리하게 된다.
또한, 상기 프로그램 시작 검출부(28)에 의해 제6 프로그램이 변경 수신되다고 검출하게 되는 경우, 상기 마이컴(23)에서는, 제6 프로그램의 시작 기록위치 정보(Program #6_SA)를, 상기 메모리(25)에 기록 저장하게 되므로, 사용자가 현재 시청 중인 제6 방송 프로그램의 시작 위치 서치 동작을 갑자기 요청하더라도, 상기 메모리에 저장된 제6 프로그램의 시작 기록위치 정보(Program #6_SA)를 검색 참조하여, 그에 상응하는 기록위치를 신속하게 서치 및 재생할 수 있게 되는 데, 이에 대해 상세히 설명하면 다음과 같다.

도 5는, 본 발명에 따른 방송 프로그램의 시작 위치 서치 방법에 대한 동작 흐름도를 도시한 것으로, 예를 들어 상기 마이컴(23)에서는, 상기 튜너(20)를 동작 제어하여, 입력의 한 방송 채널을 선택한 후, 상기 신호 처리부(21)와 MPEG 디코더 (22)를 동작 제어하여, 상기 방송 채널을 통해 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하는 일련의 방송 프로그램 수신 동작을 수행하게 된다(S10).

한편, 상기 마이컴(23)에서는, 사용자에 의해 PVR 모드가 기 설정되어 있는 경우(S11), 상기 HDR 시스템(26)을 동작 제어하여, 상기 수신되는 방송 프로그램을, 하드 디스크(27)에 실시간으로 연속 기록하게 되고(S12), 상기 프로그램 시작 검출부(28)에서는, 전송한 바와 같이, 이피지(EPG) 정보 또는 비디오 및 오디오의 변화 등을 참조하여, 새로운 방송 프로그램의 시작 여부를 검출하게 된다.
그리고, 상기 검출 결과, 새로운 방송 프로그램의 시작을 검출하는 경우 (S13), 상기 마이컴(23)에서는, 상기 하드 디스크(27)에 기록되는 새로운 프로그램의 시작 기록위치 정보를, 상기 메모리(25)에 구분 저장하게 되는 데(S14), 예를 들어 도 4를 참조로 전달한 바와 같이, 상기 메모리(25)에는, 제1 내지 제3 프로그램의 시작 기록위치 정보(Program #1_SA~#3_SA)와 함께, 새로 기록되는 제4 프로그램의 시작 기록위치 정보(Program #4_SA)가 추가로 구분 저장된다.

또한, 상기 마이컴(23)에서는, 현재의 기록위치와, 상기 메모리에 기 저장된 기록위치 정보를 비교하게 되는 데, 예를 들어 도 4를 참조로 전달한 바와 같이, 제1 프로그램이 기록된 데이터 구간에, 제5 프로그램을 갱신 기록하게 되면, 그 시점의 현재 기록위치가, 상기 제1 프로그램의 시작 기록위치 정보(Program #1_SA)와 일치하게 되므로, 상기 마이컴(23)에서는, 메모리에 저장된 제1 프로그램의 기록위치 정보를 실시간으로 삭제하게 된다(S16).

그리고, 사용자가 현재 시청 중인 프로그램, 예를 들어 제6 방송 프로그램 (Program #6)을 시청하던 도중, 그 방송 프로그램의 시작 위치 서치 동작을 요청하게 되면(S17), 상기 마이컴(23)에서는, 상기 메모리에 구분 저장된 제6 프로그램의 시작 기록위치 정보(Program #6_SA)를 검색 참조하여, 해당 기록위치를 서치한 후 (S18), 사용자가 요청하는 해당 동작, 예를 들어 재생 동작을 수행하게 되므로 (S19), 상기 하드 디스크(27)에 갱신 기록되는 방송 프로그램의 시작 부분을 신속하게 서치 및 재생할 수 있게 된다.
이상, 전술한 본 발명의 바람직한 실시에는, 예시의 목적을 위해 개시된 것으로, 당연하리라면, 이하 첨부된 특허청구범위에 개시된 본 발명의 기술적 사상과 그 기술적 범위 내에서, 또다른 다양한 실시예들을 재량, 변경, 대체 또는 부가 등이 가능할 것이다.

【발명의 효과】

상기와 같이 구성 및 이루어지는 본 발명에 따른 방송 프로그램의 시작 위치 서치 장치 및 방법은, 예를 들어, PVR 기능이 구비된 셋탑 박스와 같은 디지털 방송 수신기에서, 실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하면서, 하드 디스크(HDD)와 같은 기록매체에 기록함과 아울러, 새로운 방송 프로그램의 시작 부분을 기록하게 되는 경우, 그 기록위치 정보를 메모리 등에 구분 기록하고, 또한 상기 기록매체에 이미 기록된 데이터를, 새로운 데이터로 갱신 기록하면서, 현재의 기록위치를 확인하여, 상기 구분 저장된 기록위치 정보를 실시간으로 갱신 관리함으로써, 사용자가 방송 프로그램의 시작 위치 서치 동작을 요청하는 경우, 상기 갱신 관리되는 기록위치 정보를 검색 참조하였으며, 하드 디스크와 같은 기록매체에 갱신 기록된 방송 프로그램의 시작 부분을 신속하게 탐색 및 재생할 수 있게 되므로, 사용자가 원하는 서치 동작을 정상적으로 수행할 수 있게 되는 매우 유용한 발명인 것이다.
【특허청구범위】

【청구항 1】

실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하면서, 기록매체에 기록하는 1단계;

상기 기록매체에 새로운 방송 프로그램의 시작 부분을 기록하는 경우, 그 기록위치 정보를 구분 저장하는 2단계;

상기 기록매체에 이미 기록된 데이터를, 새로운 데이터로 갱신 기록하면서, 현재의 기록위치를 확인하여, 상기 구분 저장된 기록위치 정보를 갱신 관리하는 3단계; 및

상기 기록위치 정보를 검색 참조하여, 상기 기록매체에 갱신 기록된 방송 프로그램의 시작 부분을 탐색 재생하는 4단계를 포함하여 이루어지는 것을 특징으로 하는 방송 프로그램의 시작 위치 서치 방법.

【청구항 2】

제 1항에 있어서,

상기 새로운 방송 프로그램의 시작 부분은, 이面白(EPG) 정보에 의해 검출되거나, 또는 오디오 및 비디오 신호의 변화에 의해 검출되는 것을 특징으로 하는 방송 프로그램의 시작 위치 서치 방법.

【청구항 3】

제 1항에 있어서,
상기 기록위치 정보는, 상기 기록매체와는 별도로 기기 내에 포함 구성되는 메모리에 구분 저장되는 것을 특정으로 하는 방송 프로그램의 시작 위치 서치 방법.

【정규항 4】

제 1항에 있어서,

상기 3단계는, 상기 새로운 데이터를 갱신 기록하면서, 현재의 기록위치가, 상기 구분 저장된 기록위치를 초과하게 되면, 그에 해당하는 기록위치 정보를 실시간으로 삭제하는 것을 특정으로 하는 방송 프로그램의 시작 위치 서치 방법.

【정규항 5】

실시간으로 수신되는 방송 프로그램을 오디오 및 비디오로 출력 표시하기 위한 신호 처리수단;

상기 방송 프로그램을 기록매체에 기록하기 위한 기록수단;

상기 기록매체에 기록되는 새로운 방송 프로그램의 시작 부분을 검출하기 위한 검출수단; 및

상기 방송 프로그램의 시작 부분이 검출되면, 그 기록위치 정보를 메모리에 구분 저장함과 아울러, 실시간으로 데이터가 갱신 기록되는 현재의 기록위치가, 상기 구분 저장된 기록위치를 초과하게 되면, 그에 해당하는 기록위치 정보를 삭제 처리하는 제어수단을 포함하여 구성되는 것을 특정으로 하는 방송 프로그램의 시작 위치 서치 장치.
【청구항 6】

제 5항에 있어서,

상기 제어수단은, 사용자의 요청에 따라, 상기 기록위치 정보를 검색 참조하여, 상기 기록매체에 기록된 방송 프로그램의 시작 부분을 탐색 재생하는 것을 특징으로 하는 방송 프로그램의 시작 위치 서치 장치.

【청구항 7】

제 5항에 있어서,

상기 검출수단은, 이피지(EPG) 정보 또는 오디오 및 비디오 신호의 변화에 근거하여, 새로운 방송 프로그램의 시작 부분을 검출하는 것을 특징으로 하는 방송 프로그램의 시작 위치 서치 장치.
HDD

Header

FAT

Add #

Program #1

Add #

Program #2

Add #

Program #3

(No Record)

Program #1_Info

Program #2_Info

Program #3_Info

Data Area
【도 4】

HDD

Header
FAT
Program #5 (2/2)
Program #6
Program #2
Program #3
Program #4
Program #5 (1/2)

Memory

Program #1_SA
Program #2_SA
Program #3_SA

Add #

(Delete)

Program #1_SA
Program #2_SA
Program #3_SA
Program #4_SA
Program #5_SA
Program #6_SA
【도 5】

시작

방송 프로그램 수신

PVR 모드 설정 ?

YES

S11

NO

S12

새로운 방송 프로그램 시작 검출 ?

S13

NO

YES

S14

기록위치 정보 생성 및 메모리에 구를 저장

S15

NO

YES

현재 기록위치 - 기 저장된 기록위치 ?

S16

방송 프로그램 시작 위치 서치 요청 ?

S17

YES

NO

S18

메모리에 구를 저장된 기록위치 정보를 참조하여 해당 기록위치 서치

S19

사용자가 요청하는 해당 동작 수행

끝
NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given TWO MONTHS from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing. Applicant must submit $300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing. A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required. Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $1130 for a Large Entity

- $300 Statutory basic filing fee.
- $130 Surcharge.
- The application search fee has not been paid. Applicant must submit $500 to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $200 to complete the examination fee for a large entity

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 3 - OFFICE COPY
UTILITY PATENT APPLICATION TRANSMITTAL UNDER 37 C.F.R. §1.53(b)

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP PATENT APPLICATION
Randolph Building
4200 Dulany Street
Alexandria, VA 22314

Transmitted herewith for filing is the patent application of
INVENTOR: Dong Chul CHUNG

FOR: APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

Enclosed are:
1. ☑ 14 pages of specification, claims, abstract
2. ☐ 5 sheets of FORMAL drawings
3. ☐ 0 pages of newly executed Declaration & Power of Attorney (copy or original) (To Follow)
5. ☐ Applicant claims Small Entity Status
6. ☐ Information Disclosure Statement, Form PTO-1449 and references
7. ☑ Assignment papers for Humax Co., Ltd
(coversheet, assignment and assignment fee) (To Follow)
9. ☑ Two (2) return postcards
☐ Stamp & Return with Courier
☐ Prepaid postcard-stamped filing date & returned with unofficial Serial Number
10. ☑ Authorization under 37 C.F.R. §1.136(a)(3)
12. ☐ Other:

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☐ A check in the amount of $ (Check #_______) is attached.
☐ Please charge my Deposit Account No. 16-0607 in the amount of $ . A duplicate copy of this sheet is enclosed.
☐ The Commissioner is hereby authorized to charge payment of following fees during the pendency of this application or credit any overpayment to Deposit Account No. 16-0607.

☐ Any additional filing fees required under 37 C.F.R. 1.16.
☐ Any patent application processing fees under 37 C.F.R. 1.17.
☐ Any filing fees under 37 C.F.R. 1.16 for presentation of extra claims.

Respectfully submitted,
FLESHNER & KIM, LLP

Daniel Y.J. Kim
Registration No. 36,186

P.O. Box 221200
Chantilly, Virginia 20153-1200
703 766-3701 Dyk/dak
Date: January 24, 2006
Please direct all correspondence to Customer Number 34610
APPARATUS AND METHOD FOR SEARCHING START POSITION OF BROADCASTING PROGRAM

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method and apparatus for searching a start position of a broadcast program, and more particularly, to an apparatus and method for searching a start position of a broadcast program which is recorded in a recording medium.

Description of the Related Art

Digital broadcast receivers, such as a set top box (STB), for receiving digital broadcasts are widely popularized. Recently, a digital broadcast receiver having a Personal Video Recording (PVR) function which is capable of recording broadcast programs in a recording medium such as a hard disc drive (HDD), is developed and popularized.
The digital broadcast receiver, as illustrated in FIG. 1, includes a tuner 10, a signal processor 11, a MPEG decoder 12, a microprocessor 13, an OSD generator 14, a memory 15, a HDR (HDD Recording) system 16, a hard disc (HDD), etc.

The microprocessor 13 controls the tuner 10 to select an arbitrary broadcast channel according to a user’s request, and controls the signal processor 11 and the MPEG decoder 12 to output a broadcast program received through the broadcast channel as audio and video.

Also, the microprocessor 13 controls the HDR system 16 to record, in real time, a broadcast program being received in the HDD 17, according to a user’s request.

In the HDD 17, as illustrated in FIG. 2, a header area, a File Allocation Table (FAT) area, and a data area are divided and allocated.

When recording broadcast programs in the data area of the HDD 17, the microprocessor 13 creates first, second, and third program information Program#1_Info, Program#2_Info, and Program#3_Info respectively corresponding to first, second, and third broadcast programs Program#1, Program#2, and Program#3 sequentially recorded, and records the first, second, and third program information Program#1_Info, Program#2_Info, and Program#3_Info in the FAT area. The first, second, and third program information Program#1_Info, Program#2_Info, and Program#3_Info include addresses Add# of data sections in which the respective programs are recorded, data sizes, reproduction times, etc.
If a user requests reproduction of an arbitrary broadcast program, for example, the third broadcast program Program#3, the microprocessor 13 reproduces the third broadcast program Program#3 from its recording start position with reference to a start address Add# included in the corresponding third program information Program#3_Info.

However, a digital broadcast receiver having a general PVR function creates the corresponding program information and records it in a FAT area after a data recording operation of recording a broadcast program in a HDD is terminated. Accordingly, when a user requests reproduction of a start part of a broadcast program which is received and recorded in real time, it is difficult to quickly search a recording position corresponding to the start part of the broadcast program.

Also, although a broadcast program which is received and recorded in real time changes to a new broadcast program while a data recording operation is performed, the digital broadcast receiver manages only the recording position of the broadcast program received when the data recording operation has been started, without separately managing a recording position of the new broadcast program. Accordingly, it is difficult to quickly search a recording position corresponding to a start part of a broadcast program which a user currently listens and views.
SUMMARY OF THE INVENTION

To resolve the problem described above, there is provided a method for quickly searching a start position of a broadcast program which is currently recorded.

Accordingly to an aspect of the present invention, there is provided a method for searching a start position of a broadcast program, including: when a new broadcast program is started while recording a broadcast program which is received and output as audio and video in a recording medium, storing position information regarding a start part of the new broadcast program; and searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information.

According to another aspect of the present invention, there is provided an apparatus for searching a start position of a broadcast program, including: a signal processor outputting a received broadcast program as audio and video; a recording unit recording the broadcast program in a recording medium; a detection unit detecting whether a new broadcast program is started; a memory storing position information regarding a start part of a broadcast program; and a control unit storing position information regarding a start part of the new broadcast program in the memory if the new broadcast program is started, and searching and reproducing the start part of the new broadcast program recorded in the recording medium with reference to the position information.

Preferably, a determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals.
Preferably, if a position at which data of a current broadcast program is recorded is identical to position information of a different broadcast program stored in the memory, the position information of the different broadcast program is deleted. Preferably, the position information is divided and stored for each broadcast program.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a block diagram of a digital broadcast receiver having a general Personal Video Recording (PVR) function;

FIG. 2 illustrates an embodiment in which broadcast programs are recorded and managed in a hard disc (HDD) of the digital broadcast receiver having the general PVR function;

FIG. 3 is a block diagram of a digital broadcast receiver having a PVR function, according to an embodiment of the present invention;

FIG. 4 illustrates an embodiment in which broadcast programs are recorded and managed in a HDD of the digital broadcast receiver having the PVR function according to the embodiment of the present invention; and

FIG. 5 is a flowchart illustrating a method for searching a start position of a broadcast program, according to an embodiment of the present invention.
DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Hereinafter, an apparatus and method for searching a start position of a broadcast program, according to the present invention, will be described in detail with reference to the appended drawings.

Referring to FIGS. 3, a digital broadcast receiver, such as a set top box, a TV, etc., having a Personal Video Recording (PVR) function, to which the present invention is applied, includes a tuner 20, a signal processor 21, a MPEG decoder 22, a microprocessor 23, an OSD generator 24, a memory 25, a HDR system 26, and a hard disc (HDD). The digital broadcast receiver can further include a program start detecting unit 28.

The program start detecting unit 28 detects whether a broadcast program which is received in real time changes to a new broadcast program. The program start detecting unit 28 detects whether a broadcast program which is currently received changes to a new broadcast program, for example, with reference to Electronic Program Guide (EPG) information additionally provided through a digital broadcast.

Alternatively, the program start detecting unit 28 can detect whether the broadcast program changes according to a change in video and audio signals appearing between broadcast programs. For example, if a video period of a black screen and an audio period of no sound are simultaneously detected for a predetermined time, the program start detecting unit 28 determines that the broadcast program which is received in real time changes to a new broadcast program.
The microprocessor 23 controls the tuner 20 to select an arbitrary broadcast channel according to a user’s request, and controls the signal processor 21 and the MPEG decoder 22 to output a broadcast program received through the broadcast channel as audio and video.

Also, the microprocessor 23 controls the HDR system 26 to record the broadcast program which is received in real time in the HDD 27, according to a user’s request.

For example, as illustrated in FIG. 4, when a new fourth broadcast program Program#4 is recorded in the state where first, second, and third programs Program#1, Program#2, and Program#3 are recorded in a data area of the HDD 27, the microprocessor 23 temporarily stores recording start position information Program#4_SA of the fourth broadcast program Program#4 being currently recorded, separately, in the memory 25, in addition to recording start position information Program#1_SA, Program#2_SA, and Program#3_SA corresponding to the first, second, and third broadcast programs Program#1, Program#2, and Program#3.

Thereafter, if the program start detecting unit 28 detects that a new broadcast program, for example, a fifth broadcast program Program#5 is received, the microprocessor 23 stores recording start position information Program#5_SA of the fifth program Program#5 in the memory 25.

Then, as illustrated in FIG. 4, if the fifth broadcast program Program#5 is overwritten on the data section in which the first broadcast program Program#1 is recorded, the microprocessor 23 deletes the recording start position information Program#1_SA of
the first broadcast program Program\#1 stored in the memory 25 in real time.

Also, if the program start detecting unit 28 detects that a sixth broadcast program Program\#6 is received, the microprocessor 23 stores recording start position information Program\#6_SA of the sixth broadcast program Program\#6 in the memory 25. Accordingly, when a user requests reproduction of a start part of the sixth broadcast program Program\#6 which he or she currently listens and views, the sixth broadcast program Program\#6 can be quickly reproduced from its recording start position using the recording start position information Program\#6_SA of the sixth broadcast program Program\#6 stored in the memory 25.

FIG. 5 is a flowchart illustrating a method for searching a start position of a broadcast program, according to an embodiment of the present invention.

The microprocessor 23 controls the tuner 20 to select an arbitrary broadcast channel, and controls the signal processor 21 and the MPEG decoder 22 to output a broadcast program received through the broadcast channel as audio and video (operation S10).

Meanwhile, if a PVR mode is set by a user (operation S11), the microprocessor 23 controls the HDR system 26 to record the received broadcast program in the HDD 27 in real time (operation S12), and the program start detecting unit 28 detects whether a new broadcast program is started with reference to EPG information or a change in video and audio signals, etc.

If the programs start detecting unit 28 detects that a new broadcast program is started (operation S13), the microprocessor
23 stores recording start position information of the new broadcast program to be recorded in the HDD 27, separately, in the memory 25 (operation S14). For example, as described above with reference to FIG. 4, the memory 25 stores recording start position information Program#4_SA of a fourth broadcast program #4, in addition to recording start position information Program#1_SA, Program#2_SA, and Program#3_SA of first, second, and third broadcast programs Program#1, Program#2, and Program#3.

Then, the microprocessor 23 compares the current recording position with recording position information stored in the memory 25 (operation S15). For example, as described above with reference to FIG. 4, if a fifth broadcast program Program#5 is overwritten on the data section in which the first broadcast program Program#1 is recorded, the current recording position is identical to the recording start position information Program#1_SA of the first broadcast program Program#1. In this case, the microprocessor 23 deletes the recording start position information Program#1_SA of the first broadcast program Program#1 stored in the memory 25 in real time (operation S16).

If a user requests an operation of searching a start position of a current broadcast program, for example, a sixth broadcast program Program#6 while listening and viewing the broadcast program Program#6 (operation S17), the microprocessor 23 reproduces the sixth broadcast program Program#6 from its start part recorded in the corresponding recording position, with reference to recording start position information Program#6_SA of the sixth broadcast program Program#6 stored in the memory 25 (operation S18). Then,
the microprocessor 23 performs an operation requested by the user (operation S19). Accordingly, it is possible to quickly search and reproduce the start part of a broadcast program updated and recorded in the HDD 27.

Accordingly, it is possible to quickly search and reproduce a start part of a broadcast program which is currently recorded.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.
What is claimed is:

1. A method for searching a start position of a broadcast program, comprising:

   when a new broadcast program is started while recording a broadcast program which is received and output as audio and video in a recording medium, storing position information regarding a start part of the new broadcast program; and

   searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information.

2. The method according to claim 1, wherein a determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals.

3. The method according to claim 1, wherein the position information is stored in a memory, separately from the recording medium.

4. The method according to claim 3, wherein the position information is divided and stored for each broadcast program.

5. The method according to claim 1, further comprising, if a position at which data of the current broadcast program is recorded is identical to position information of a different broadcast program.
program stored in the memory, deleting the position information of the different broadcast program.

6. An apparatus for searching a start position of a broadcast program, comprising:

a signal processor outputting a received broadcast program as audio and video;

a recording unit recording the broadcast program in a recording medium;

a detection unit detecting whether a new broadcast program is started;

a memory storing position information regarding start parts of broadcast programs; and

a control unit storing the position information regarding the start part of the new broadcast program in the memory if the new broadcast program is started, and searching and reproducing a start part of a current broadcast program recorded in the recording medium with reference to the position information.

7. The apparatus according to claim 6, wherein the detection unit detects whether the new broadcast program is started on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals.

8. The apparatus according to claim 6, wherein the position information is divided and stored for each broadcast program.
9. The apparatus according to claim 6, wherein, if a position at which data of the current broadcast program is recorded is identical to position information of a different broadcast program stored in the memory, the control unit deletes the position information of the different broadcast program.

10. The apparatus according to claim 6, wherein the apparatus is installed in a TV or a set top box which receives digital broadcasts.
ABSTRACT OF THE DISCLOSURE

Provided are an apparatus and method for searching a start position of a broadcast program. According to an embodiment of the present invention, a received broadcast program is recorded in a recording medium while being output as video and audio. If a new broadcast program is started, position information regarding a start part of the new broadcast program is stored in a memory. Thus, a current broadcast program is reproduced from a start part by searching a start position of the current broadcast program recorded in the recording medium with reference to stored position information. A determination on whether the new broadcast program is started is done on the basis of Electronic Program Guide (EPG) information or a change in audio and video signals. Accordingly, it is possible to quickly search and reproduce a start part of a broadcast program which is currently recorded.
FIG. 4

HDD
- Header
- FAT
- Program #5 (2/2)
- Program #6
- Program #2
- Program #3
- Program #4
- Program #5 (1/2)

Memory
- Program #1_SA
- Program #2_SA
- Program #3_SA

Add #

(Delete)
- Program #1_SA
- Program #2_SA
- Program #3_SA
- Program #4_SA
- Program #5_SA
- Program #6_SA
FIG. 5

Start

receive broadcast program

S10

PVR mode set?

S11

Yes

successively record broadcast program in HDD in real time

S12

No

new broadcast program started?

S13

Yes

create recording position information and divide and store it in memory

S14

No

current recording position identical to stored recording position?

S15

Yes

delete corresponding recording position information in real time

S16

No

request of searching start position of broadcast program received?

S17

Yes

search corresponding recording position with reference to recording position information stored in memory

S18

No

perform operation requested by user

S19

End
### PATENT APPLICATION FEE DETERMINATION RECORD

**Application or Docket Number:** 1/33.

#### APPLICATION AS FILED – PART I

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APPLICATION SIZE FEE (37 CFR 1.16(x))

*If the application and drawings exceed 100 sheets of paper, the application size fee due is $2,500 ($750 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(a).*

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $2,500 ($750 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(a).

MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))

*If the difference in column 1 is less than zero, enter "0" in column 2.

#### APPLICATION AS AMENDED – PART II

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<td>Minus</td>
</tr>
<tr>
<td>Independent (37 CFR 1.16(g))</td>
<td><em>X</em></td>
<td>Minus</td>
</tr>
</tbody>
</table>

APPLICATION SIZE FEE (37 CFR 1.16(x))

FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))

### AMENDMENT B

<table>
<thead>
<tr>
<th>CLAIMS REMAINING AFTER AMENDMENT</th>
<th>HIGHEST NUMBER PREVIOUSLY PAID FOR</th>
<th>PRESENT EXTRAS</th>
</tr>
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<tbody>
<tr>
<td>Total (37 CFR 1.16(f))</td>
<td><em>X</em></td>
<td>Minus</td>
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<tr>
<td>Independent (37 CFR 1.16(g))</td>
<td><em>X</em></td>
<td>Minus</td>
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</table>

APPLICATION SIZE FEE (37 CFR 1.16(x))

FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))


* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IS THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IS THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.18. The information is required to obtain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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