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 1341 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):

Ho Yi, Seongnam-si, KOREA, REPUBLIC OF;
Seung-Kwan Ha, Seoul, KOREA, REPUBLIC OF;
Jun-Hyung Kim, Seongnam-si, 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**  
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)

3610  
7590  
05/25/2012  
KED & ASSOCIATES, LLP  
P.O. Box 8638  
Reston, VA 20195

**APPLICATION NO.**  
11/872,149  
**FILING DATE**  
10/15/2007  
**FIRST NAMED INVENTOR**  
Ho Yi

**ATTORNEY DOCKET NO.**  
EZ-0004  
**CONFIRMATION NO.**  
8310

**TITLE OF INVENTION:** DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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**EXAMINER**  
DUBSKY, GIGI L  
2421  
348-731000

**ART UNIT**  
2421  
**CLASS-SUBCLASS**  
348-731000

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.

   **(B) RESIDENCE:** (CITY and STATE OR COUNTRY)
   - SEONGNAM-SI, REPUBLIC OF KOREA

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

4a. The following fee(s) are submitted:
   - [x] Issue Fee
   - [x] 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.
   - [x] Payment by credit card. Form PTO-2138 is attached.

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**  
   Samuel W. Ntiros

   **Typed or printed name**  
   [Signature]

   **DATE**  
   August 21, 2012

   **Registration No.**  
   39,318

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 afforded 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: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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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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**Warnings:**

**Information:**

Total Files Size (in bytes): 141022

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

EXAMINER
DUBASKY, OIKI L

ART UNIT PAPER NUMBER
2421

DATE MAILED: 05/25/2012

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.
11/872,149 10/15/2007 Ho Yi EZ-0004 8310

TITLE OF INVENTION: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

APPLN. TYPE SMALL ENTITY ISSUE FEE DUE PUBLICATION FEE DUE PREV. PAID ISSUE FEE TOTAL FEE(S) DUE DATE DUE
nonprovisional NO $1740 $300 $0 $2040 08/27/2012

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.
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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

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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.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

34610
3/25/2012

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.
11/872,149 10/15/2007 Ho Yi EZ-0004 8310

TITLE OF INVENTION: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

APPLN. TYPE SMALL ENTITY ISSUE FEE DUE PUBLICATION FEE DUE PREV. PAID ISSUE FEE TOTAL FEE(S) DUE DATE DUE
nonprovisional NO $1740 $300 $0 $2040 08/27/2012

EXAMINER ART UNIT CLASS-SUBCLASS
DUBASKY, GIGI L 2421 348-731000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- Change of correspondence address (or Change of Correspondence Address form PTOB/122) attached.
- "Fee Address" indication (or "Fee Address" Indication form PTOB/847; 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 929 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 929 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).

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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 practices 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

--- 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-65) 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 04/25/2012.

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 1,4-6,11-13 and 20-25 which have been renumbered as indicated in index of claims.

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 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 ______.

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 ______.

---

/KRISTINE  KINCAID/
Supervisory Patent Examiner, Art Unit 2421

---

U.S. Patent and Trademark Office
PTOL-37 (Rev. 03-11)  Notice of Allowability  Part of Paper No./Mail Date 20120508
**Examiner-Initiated Interview Summary**

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<td>YI ET AL.</td>
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<tr>
<td>Examiner</td>
<td>GIGI L. DUBASKY</td>
</tr>
<tr>
<td>Art Unit</td>
<td>2421</td>
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</table>

All participants (applicant, applicant’s representative, PTO personnel):

1. **GIGI L. DUBASKY.**  
2. **DANIEL KIM.**  
3. **SAMUEL NTIROS.**  
4. ____.

**Date of Interview:** 5/1/12 and 5/8/12.

Type:  
- [x] Telephonic  
- [ ] Video Conference  
- [ ] Personal [copy given to: [ ] applicant  
- [ ] applicant’s representative]

Exhibit shown or demonstration conducted:  
- [ ] Yes  
- [x] No.

Issues Discussed:  
- [ ] 101  
- [ ] 112  
- [x] 102  
- [ ] 103  
- [x] Others  

(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: **1,8,11,13 and 17.**

Identification of prior art discussed: **n/a.**

**Substance of Interview**
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

*Discussed some adjustments to above mentioned claims to be under allowable condition and got authorization for Examiner Amendment.*

---

**Applicant recollection instructions:** It is not necessary for applicant to provide a separate record of the substance of interview.

** Examiner recollection instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recollection of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recollection including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

- [ ] Attachment

/KRISTINE KINCAID/  
Supervisory Patent Examiner, Art Unit 2421

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U.S. Patent and Trademark Office  
PTOL-413B (Rev. 8/11/2010)  
Interview Summary  
Paper No. 20120508
EXAMINER’S AMENDMENT

1. An examiner’s amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner’s amendment was given in a telephone interview with Daniel Kim on 05/01/2012.

The application has been amended as follows:

Claim 1: Replace claim 1 with the following amendment:

A one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:
(a) tuning a tuner corresponding to an applied channel setting value chosen from available channel setting values based on combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value; and
(b) setting an antenna and a tuner to correspond with the applied channel setting value in accordance with a tuning result, wherein:
one or more of the available channel setting values are produced to correspond to channel setting value factors that include satellite information, LNB information, a DiSEqC switch value and a factor indicating whether or not 22 KHz tone is used, and tuner information,
operation (a) is repeated for a number of all possible combinations of the available channel setting values, and
the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners.
Claim 8: Cancel claim 8.

Claim 11: Delete “claim 11” and add “claim 1” at line 1.

Claim 13: Replace claim 13 with the following amendment:

A digital broadcast receiver comprising:
a tuner unit having one or more tuners and configured to tune a signal inputted
from an antenna;
a controller configured to tune a tuner corresponding to an applied channel
setting value chosen from available channel setting values based on
combinations of channel setting value factors by referencing a transponder list
noting the applied channel setting value, and configured to set an
antenna and a tuner to correspond with the applied channel setting value in
accordance with a tuning result; and
a channel information storage area configured to store channel information
based on a processed signal of a transponder tuned by the tuner, wherein:
one or more of the available channel setting values are produced to correspond
to channel setting value factors that include satellite information, LNB
information, a DiSEqC switch value and a factor indicating whether or not 22 KHz
tone is used, and tuner information.
the controller attempts to tune the tuner repeatedly for a number of all possible
combinations of the available channel setting values, and
the number of all possible combinations is calculated by multiplying a number of
satellite information, a number of LNB information, a number of DiSEqC switch
values, a number of possible cases on whether or not 22 KHz tone is used, and a
number of tuners.

Claim 17: Cancel claim 17.

2. The following is an examiner’s statement of reasons for allowance:

The arts of record either alone or in combination fails to particularly disclose or
suggest the claimed limitation of “one or more of the available channel setting values
are produced to correspond to channel setting value factors that include satellite
information, LNB information, a DiSEqC switch value and a factor indicating whether or
not 22 KHz tone is used, and tuner information” as well as “the number of all possible
combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners” in combination with other elements recited in the claims 1 and claim 13.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GIGI L. DUBASKY whose telephone number is (571)270-5686. The examiner can normally be reached on Monday through Thursday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, KRISTINE L. KINCAID can be reached on 571-272-4063. 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.

GD

/KRISTINE KINCAID/
Supervisory Patent Examiner, Art Unit 2421
## Search Notes

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05/08/2012

Total Claims Allowed: 13

05/21/2012

O.G. Print Claim(s) 1
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Ho YI, Seung-Kwan HA and Jun-Hyung KIM

Serial No: 11/872,149

Filed: October 15, 2007

For: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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 February 29, 2012, 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 8.
Listing of Claims

1. (Currently Amended) A one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:

   (a) tuning a tuner corresponding to an applied channel setting value chosen from available channel setting values based on made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value; and

   (b) setting an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result, wherein:

   one or more of the available channel setting values are produced to correspond to channel setting value factors that include satellite information, LNB information, and tuner information.

   operation (a) is repeated for a number of all possible combinations of the available channel setting values, and

   the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners

   wherein the operation (b) comprises: determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite; and setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result
indicates a match, and, if there is no match, the method proceeds again to the operation (a) with the applied channel setting value removed.

2-3 (Canceled)

4. (Currently Amended) The method of claim 1 [[3]], wherein the operation (b) comprises proceeding again to the operation (a) with the chosen applied channel setting value removed, if the tuning is unsuccessful.

5. (Currently Amended) The method of claim 24 [[3]], wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.

6. (Original) The method of claim 5, wherein the PSI/SI data of the stored transponder signal information and the signal of the transponder are pre-stored in the digital broadcast receiver.

7. (Canceled)

8. (Currently Amended) The method of claim 1 [[7]], wherein the channel setting value factors further include a DiSEqC switch value and a factor indicating whether or not 22 KHz tone is used.

9-10 (Canceled)
11. (Currently Amended) The method of claim 11 [[10]], wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the operation (a).

12. (Original) The method of claim 1, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the operation (a) using a different applied channel setting value.

13. (Currently Amended) A digital broadcast receiver comprising:

   a tuner unit having one or more tuners and configured to tune a signal inputted from an antenna;

   a controller unit configured to tune a tuner corresponding to an applied channel setting value chosen from available channel setting values based on made-from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and configured to set an antenna and a tuner to correspond with the applied channel setting value in accordance with the a tuning result; and

   a channel information storage area unit configured to store channel information based on a processed [[a]] signal of a transponder tuned by the tuner and store as channel information, wherein:

   one or more of the available channel setting values are produced to correspond to
channel setting value factors that include satellite information, LNB information, and tuner information,

the controller attempts to tune the tuner repeatedly for a number of all possible combinations of the available channel setting values, and

the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners

wherein the control unit is configured to: determine, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, set the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and repeat a channel setting procedure with the applied channel setting value removed; if there is no match, and repeat a channel setting procedure with the applied channel setting value removed; if the tuning is unsuccessful.

14-16  (Canceled)

17.  (Currently Amended) The digital broadcast receiver of claim 13 16, wherein the channel setting value factors further include a DiSEqC switch value and a value indicating whether or not 22 KHz tone is used.

18-19  (Canceled)
20. (Currently Amended) The digital broadcast receiver of claim 1349, wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the channel setting procedure.

21. (Currently Amended) The digital broadcast receiver of claim 1345, wherein the controller determines determining, of whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.

22. (Currently Amended) The digital broadcast receiver of claim 21, further comprising a transponder information storage area unit configured to store the PSI/SI data of the signal of the transponder and the transponder list.

23. (Original) The digital broadcast receiver of claim 13, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the tuning using a different applied channel setting value.

24. (New) The digital broadcast receiver of claim 1, wherein operation (b) comprises: determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite; and
setting the antenna and the tuner to correspond with the applied channel setting value if a result of the determination indicates a match, and performing operation (a) again with the chosen applied setting removed if there is no match.

25. (New) The digital broadcast receiver of claim 13, wherein the controller is to:

determine, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite,

set the antenna and the tuner to correspond with the applied channel setting value if a result of the determination indicates a match, and repeating a channel setting procedure with the chosen applied setting removed if there is no match.
REMARKS

Claims 1, 4-6, 8, 11-13, 17, and 20-25 are pending.

Amendments have been made to overcome the § 112 paragraph.

Claim 1 has been amended to recite the features of claim 10 and its intervening claims, and claim 13 has been amended to recite similar subject matter. The Examiner indicated that these amendments should be sufficient to place claims 1, 13, and their dependent claims into condition for allowance.

Because the subject matter of claim 10 was indicated to be allowable before the features relating to operation (b) were added to claim 1 in the previous amendment, the subject matter pertaining to operation (b) has been moved into new claims 24 and 25 to respectively depend from claims 1 and 13.

Many of the dependent claims have been canceled or amended to be consistent with the changes to base claims 1 and 13.

Applicants submit that entry of this paper is proper, because the amendments are made for the purpose of adding allowable subject matter of claim 10 into the independent claims and therefore does not raise new issues requiring further searching or consideration by the Examiner, and because the total number of presently pending claims does not exceed the number of finally rejected claims.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and timely allowance of the application is respectfully requested.
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 8638
Reston, VA 20195
703 766-3777

Date: April 25, 2012
Please direct all correspondence to Customer Number 34610
# Electronic Acknowledgement Receipt

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**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/OE/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.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Ho Yi; Seung-Kwan HA and Jun-Hyung KIM

Serial No.: 11/872,149
Filed: October 15, 2007
Confirmation No.: 8310

For DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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

Group Art Unit: 2421
Examiner: Gigi L. DUBASKY
Customer No.: 34610

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:

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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/krf
Date: April 25, 2012

Please direct all correspondence to Customer Number 34610
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**LEGAL INSTRUMENT EXAMINER:**

/EVELYN NIMMONS/

* 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. 11/872,149
Applicant(s) YI ET AL.
Examiner GIGI L. DUBASKY
Art Unit 2421

-- 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 05 December 2011.
2a) [ ] This action is FINAL.
2b) [ ] This action is non-final.
3) [ ] 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.
4) [ ] 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

5) [ ] Claim(s) 1,2,4-14 and 16-23 is/are pending in the application.
   5a) Of the above claim(s) _____ is/are withdrawn from consideration.
6) [ ] Claim(s) _____ is/are allowed.
7) [ ] Claim(s) 1,2,4,9,12-14,16-18 and 19-23 is/are rejected.
8) [ ] Claim(s) 10 and 11 is/are objected to.
9) [ ] Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10) [ ] The specification is objected to by the Examiner.
11) [ ] 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).
12) [ ] 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

13) [ ] 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

Response to Arguments

Claims 3 and 15 have been cancelled.

Claims 1-2, 4-14 and 16-23 are pending.

1. The objection of the specification has been withdrawn due to the Applicants’ amendments.

2. The objection of the Drawing has been withdrawn and Replacement of Figure 1 is accepted and entered.

3. Applicant's arguments in the Remarks filed 12/05/2011 have been fully considered but they are not persuasive.

   In response to the Applicants’ argument that Arsenault (page 10) or Oh (page 11) does not disclose a comparison based on the tuned signal, examiner respectfully disagrees.

   Arsenault disclose the program 400 of Figures 4A-4B selects a port of multi-switcher, causes the IRD to tune to the selected satellite frequency associated with the currently selected network identifier/polarity from satellite frequencies (Col 7 lines 16-18 and 43-58), subsequently looks for whether a predetermined marker pattern is received in the tuned signal within a predetermined period of time or not, and determines the information of network identifier and polarity included with the received marker pattern.
of the tuned signal (Col 7 lines 19-29). The received information (network identifier and
polarity) of the tuned signal are compared with the currently selected network identifier
and polarity (Col 7 lines 29-33) which are pre-stored information (Col 6 lines 14-25 and
34-38). In other words, Arsenault method clearly performs the comparison based on the
tuned signal.

Oh is only relied on the teaching of using a plurality of tuners to be tuned
simultaneously.

Claim Rejections - 35 USC § 112

4. 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.

5. Claims 4-6 and 18-22 are rejected under 35 U.S.C. 112, second paragraph, as
being indefinite for failing to particularly point out and distinctly claim the subject matter
which applicant regards as the invention.

Claims 4 and 5 depend on a cancelled claim 3, as well as claims 18 and 21
depend on a cancelled claim 15. Therefore, the scope of the claims cannot be
determined.

Other dependent claims 6, 19-20 and 22 are rejected the same.
Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 4-9, 13-14, 16-18 and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Arsenault (US 6980529).

Regarding claim 1, Arsenault discloses a one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:

(a) tuning a tuner (tuner 52 in Figure 3) corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value (Figure 4A and Col 6 line 14 through Col 7 line 18 for (step 422) tuning to currently selected one of satellite frequencies (as “satellite transponders”) after (step 404) selecting one of retrieved network identifiers, (steps 406 and 408) determining the need to find a particular polarity (i.e., left-hand or right-hand polarity) for the selected network identifier and (step 418 or 420) selecting one of untried multi-switch ports; and see step 432 in Figure 4B and Col 7 lines 47-58 for continuously tuning to the next one of satellite frequencies and looping back. In other words, Arsenault discloses tuning a tuner 52 corresponding to “a frequency: a network ID: a LH/RH polarity: a multi-switch port” (each of which meets “an applied channel setting
value"), which are selected from a combination of a plurality of retrieved network
depthifiers (network as one of "value factors") associated with one or more satellite
transponders (transponder as another of "value factors") and (LH and/or RH) polarities
(LNB as another of "value factors"), and a plurality of available multi-switch ports (switch
as another of "value factors") (which meets "chosen from available channel setting
values made from combinations of channel setting value factors"), and repeating the
lines for all available satellite transponders (which meets "by referencing
a transponder list corresponding to the applied channel setting value") associated with
the selected network identifier); and

(b) setting an antenna and a tuner to correspond with the applied channel setting value
in accordance with the tuning result (Col 6 lines 1-11 and Col 7 lines 19-28 for
memorizing the association of current multi-switch port and an available particular
network identifier and polarity (to be used to set an antenna and a tuner to receive
available programs to be included in the EPG – Col 5 lines 49-65) in accordance with
the tuning result of finding a predetermined marker pattern), wherein the operation (b)
comprises:

determining, if the tuning is successful, whether or not the tuned signal of a transponder
from the transponder list matches pre-stored signal information of a transponder
 corresponing to the satellite (see steps 422 through 430 in Figures 4A-4B and Col 7
lines 16-33 for tuning to the selected satellite frequency (as "transponder") associated
with the currently selected network identifier/polarity from satellite frequencies (as
"transponder list"), if a predetermined marker pattern is received in the tuned signal
within a predetermined period of time (as “the tuning is successful”), determining whether or not the network identifier and polarity included with received marker pattern of the tuned signal of the selected satellite frequency/transponder matches the currently seeking network ID and polarity which are pre-stored information of associated satellite frequency/transponder - see Col 6 lines 14-25 and 34-38); and setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and if there is no match, the method proceeds again to the operation (a) (Col 7 line 33 through Col 8 line 6 for determining if there is a match between the received information of network identifier and polarity of tuned signal and the pre-stored information of network identifier and polarity of the associated satellite frequency/transponder (“Yes” branch of step 430 in Figure 4B), the associated information gets recorded and the program 400 moves on to check the next network identifier (loop back to step 410 in Figure 4A) (which means the association of found network ID, polarity and multi-switch port is recorded to set antenna and tuner to receive programs), and if there is no match (“No” branch of step 430), the program 400 proceeds again or loops back to either step 422 in Figure 4A for tuning to additional associated satellite frequencies/transponders or step 436 for scanning through untried multi-switch ports) with the applied channel setting value removed (Col 6 lines 11-13, Col 7 lines 24-28 and lines 40-42 for eliminating from the scanning loop or skipping on subsequent iteration of the program 400 the recorded association of the multi-switch port and the received network identifier/polarity, which reads on “the applied channel setting value is removed”).
Regarding claim 2, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the operation (a) comprises:
producing available channel setting values from combinations of channel setting value factors (Col 4 lines 30-40 and Col 6 lines 14-54 for retrieving information such as network information, i.e., network identifiers, transponders and LNB information and DiSEqC multi-switch port information (as “combinations of channel setting value factors”) from which to obtain network IDs, LH and RH polarities with or without 22 kHz, satellite frequencies and multi-switch input ports (as “available channel setting values”); choosing an applied channel setting value from the available channel setting values (steps 404, 406, 408, 416, 418 and 420 in Figure 4A for selecting one network ID, one polarity, one frequency and one multi-switch port from a plurality of network identifiers, from LH and RH polarities, from a plurality of satellite frequencies and from DiSEqC multi-switch input ports respectively); and tuning a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value (see step 422 in Figure 4A and Col 6 line 14 through Col 7 line 18 for tuning tuner 52 corresponding to the current satellite frequency selected from a list of satellite frequencies associated with selected network ID and LH/RH polarity and the selected untried multi-switch port).
Regarding claim 4, Arsenault discloses the method as discussed in the rejection of claim 3. Arsenault further discloses proceeding again to the operation (a) with the applied channel setting value removed, if the tuning is unsuccessful (see step 424 in Figure 4A and from “no” branch to step 432 in Figure 4B for, if a marker pattern is not received via the tuned signal (as “the tuning is unsuccessful”), the program keeps looking for the current network ID and polarity in associated additional frequencies (looping back to step 422) or scanning through all multi-switch ports (looping back to step 436) and skips (or removes) the received network ID and polarity as applied value on subsequent iteration of the program.

Regarding claims 5-6, Arsenault discloses the method as discussed in the rejection of claim 3. Arsenault further discloses wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder which are pre-stored in the digital broadcast receiver (Col 3 lines 41-47 for using MPEG-1 and MPEG-2 standard for video and audio signals in Arsenault's system which means PSI/SI is well-known included in MPEG transport stream (TP); Col 6 lines 1-8 for looking for a predefined marker pattern which includes data such as network identification, frequency identification and polarity type on a well-known service channel identifier (SCID) on a particular satellite frequency and polarity associated with a particular network identifier, which means that the data included in the marker pattern are PSI/SI data of transponder signal; Col 7 lines 31-33 for comparing the current stored network ID and polarity and the received network ID and polarity of the marker pattern;
and Col 6 lines 14-25 for the network identifiers associated with satellite frequencies and LH and/or RH polarities are pre-stored in the internal RAM/ROM of the IRD).

Regarding claim 7, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information (Col 3 lines 1-7 for using one or more satellites; see Figure 2 for using 4 LNB 50; and see Figure 3 for using two different tuners in which tuner 52 is for receiving satellite signals).

Regarding claim 8, Arsenault discloses the method as discussed in the rejection of claim 7. Arsenault further discloses the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used (Col 4 lines 30-44).

Regarding claim 9, Arsenault discloses the method as discussed in the rejection of claim 7. Arsenault further discloses the operation (a) is repeated for a number of all possible combinations of the available channel setting values (Col 2 lines 47-48).

Regarding claim 13, all functionalities of a digital broadcast receiver in claim 13 are analyzed and rejected corresponding to claim 1. Arsenault further discloses a tuner unit (tuner 52 and 35 in Figure 3), a control unit (microprocessor 58) and a storage unit (system RAM 70).
Regarding claim 14, all functionalities of a digital broadcast receiver in claim 14 are analyzed and rejected corresponding to claim 2.

Regarding claim 16, all functionalities of a digital broadcast receiver in claim 16 are analyzed and rejected corresponding to claim 7.

Regarding claim 17, all functionalities of a digital broadcast receiver in claim 17 are analyzed and rejected corresponding to claim 8.

Regarding claim 18, all functionalities of a digital broadcast receiver in claim 18 are analyzed and rejected corresponding to claim 9.

Regarding claim 21, all functionalities of a digital broadcast receiver in claim 21 are analyzed and rejected corresponding to claim 5.

Regarding claim 22, all functionalities of a digital broadcast receiver in claim 22 are analyzed and rejected corresponding to claim 6.
8. 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.

9. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arsenault (US 6980529) in view of Oh (US 7929062).

Regarding claim 12, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the digital broadcast receiver (IRD) has two tuners 52 and 35 (Figure 3). However, Arsenault fails to disclose each tuner is tuned simultaneously in the operation (a) using a different applied channel setting value.

Oh discloses a digital broadcast receiver having a plurality of tuners (Figure 1) for performing channel scanning methods (title). Oh discloses each tuner is tuned simultaneously in a predetermined channel in sequential parallel scanning method (Col 7 lines 48-67) or in a predetermined channel of a respective allocated channel range in frequency range allocation scanning method (Col 9 lines 51-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Arsenault's system with the teaching of Oh using a plurality of tuners to simultaneously scan channels using different applied channel setting value such as different channel value or different channel in different frequency range value, so to increase the speed of scanning in channel configuration.
Regarding claim 23, all functionalities of a digital broadcast receiver in claim 23 are analyzed and rejected corresponding to claim 12.

Allowable Subject Matter

10. Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The arts of record either alone or in combination fails to particularly disclose or suggest the claimed limitation of "the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners" which is inclusive all mentioned factors as claimed in claim 10.

Claim 11 is depended on claim 10, so objected the same.

11. Claims 19-20 are analyzed corresponding to claims 10-11 and would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
Conclusion

12. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GIGI L. DUBASKY whose telephone number is (571)270-5686. The examiner can normally be reached on Monday through Thursday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KRISTINE L. KINCAID can be reached on 571-272-4063. 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.

GD

/KRISTINE KINCAID/
Supervisory Patent Examiner, Art Unit 2421
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<td>L15</td>
<td>850</td>
<td>tun$3 with channel with set$4 with value</td>
<td>US-PG_PUB</td>
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<tr>
<td>L18</td>
<td>104</td>
<td>(generate$3 or produc$3 or creat$3 or calculat$3 or multiply$3) with channel with (set$4 or search$3 or configur$5) with (value or factor or parameter) and transponder</td>
<td>US-PG_PUB</td>
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<td>L19</td>
<td>16</td>
<td>(tun$3) with transponder near2 (data or information or list) with satellite</td>
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<td>L22</td>
<td>6200</td>
<td>automatic$4 with channel with (setting or configurat$3 or scan$4)</td>
<td>US-PG_PUB</td>
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<tr>
<td>L24</td>
<td>998</td>
<td>channel near2 (setting or configurat$3 or scan$4) and transponder</td>
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<td>8</td>
<td>multiply$3 with number same (switch$3 or DiSEqc) same tuner</td>
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<td>satellite and (LNB or low noise block) and (switch$3 or DiSEqc) and &quot;22&quot; near3 tone and tuner</td>
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<td>L28</td>
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<td>(match$3 or compar$3) with (tun$3 or receiv$3) near2 (signal or information or data) with ($4stor$3 or record$3) near2 (signal or information or data) with (transponder)</td>
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<td>(identical) with signal same (compar$3 or match$3) with (PSI or SI) with (data or information)</td>
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<td>(determin$3 or detect$3 or discrimina$3) with (tun$3 or receiv$3) with (information or signal or data) with (pre$1stor$3 or stor$3 or record$3 or sav$3) with (&quot;same&quot; or identical) same transponder</td>
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<td>128</td>
<td>(stor$3 or sav$3) with transponder with (information or data) same (match$3 or compar$3) with (tun$3 or receiv$3) with (signal or information)</td>
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<td>(compar$3 or match$3) with (receiv$3 or obtain$3) with (PSI or SI) near2 (data or information) with (stor$3) with (information or data)</td>
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Ho YI; Seung-Kwan HA and Jun-Hyung KIM

Confirmation No: 8310

Group Art Unit: 2421

Serial No: 11/872,149

Examiner: Dubasky, G.

Filed: October 15, 2007

Customer No: 34610

For: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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 3, 2011, in connection with the above-identified application. A Petition for Extension of time is filed herewith to make the filing of this paper timely.

Amendments to the Specification begin on page 2.

Amendments to the Claims are in the Listing of Claims beginning on page 3.

Amendments to the Drawings are discussed on page 9.

Remarks begin on page 10.

Attachment: Replacement Sheet
Amendments to the Specification

Please amend the paragraph beginning on line 17 of page 19 as follows:

The transponder information storage unit 30 may be a storage device for storing the information of satellites connected to the digital broadcast receiver, the transponder lists of these satellites, and each of the transponder information. Here, the transponder list of a satellite and each of the transponder information may be pre-stored in the digital broadcast receiver, for example, using any one of a number of techniques known to those skilled in the art; by referencing a website such as http://www.lyngsat.com/ and http://www.sateodx.com/, and in which satellite information is updated.
Listing of Claims

1. (Currently Amended) A one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:

   (a) tuning a tuner corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value; and

   (b) setting an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result, wherein the operation (b) comprises:

      determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite; and

      setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and, if there is no match, the method proceeds again to the operation (a) with the applied channel setting value removed.

2. (Original) The method of claim 1, wherein the operation (a) comprises:

   producing available channel setting values from combinations of channel setting value factors;

   choosing an applied channel setting value from the available channel setting values; and

   tuning a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.
3. (Canceled)

4. (Original) The method of claim 3, wherein the operation (b) comprises proceeding again to the operation (a) with the applied channel setting value removed, if the tuning is unsuccessful.

5. (Original) The method of claim 3, wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.

6. (Original) The method of claim 5, wherein the PSI/SI data of the stored transponder signal information and the signal of the transponder are pre-stored in the digital broadcast receiver.

7. (Original) The method of claim 1, wherein the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information.

8. (Original) The method of claim 7, wherein the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used.

9. (Original) The method of claim 7, wherein the operation (a) is repeated for a number of all possible combinations of the available channel setting values.
10. (Original) The method of claim 9, wherein the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners.

11. (Original) The method of claim 10, wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the operation (a).

12. (Original) The method of claim 1, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the operation (a) using a different applied channel setting value.

13. (Currently Amended) A digital broadcast receiver comprising:

   a tuner unit having one or more tuners and configured to tune a signal inputted from an antenna;

   a control unit configured to tune a tuner corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and configured to set an antenna and a tuner to correspond with the applied
channel setting value in accordance with the tuning result; and a channel information storage unit configured to process a signal of a transponder tuned by the tuner and store as channel information,

wherein the control unit is configured to: determine, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, set the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and repeat a channel setting procedure with the applied channel setting value removed, if there is no match, and repeat a channel setting procedure with the applied channel setting value removed, if the tuning is unsuccessful.

14. (Original) The digital broadcast receiver of claim 13, wherein the control unit is configured to produce available channel setting values from combinations of channel setting value factors, choose an applied channel setting value from the available channel setting values, and tune a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.

15. (Canceled)

16. (Original) The digital broadcast receiver of claim 13, wherein the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information.
17. (Original) The digital broadcast receiver of claim 16, wherein the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used.

18. (Original) The digital broadcast receiver of claim 15, wherein the channel setting procedure is repeated for a number of all possible combinations of the available channel setting values.

19. (Original) The digital broadcast receiver of claim 18, wherein the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners.

20. (Original) The digital broadcast receiver of claim 19, wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the channel setting procedure.

21. (Original) The digital broadcast receiver of claim 15, wherein the determining, of whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.
22. (Original) The digital broadcast receiver of claim 21, further comprising a transponder information storage unit configured to store the PSI/SI data of the signal of the transponder and the transponder list.

23. (Original) The digital broadcast receiver of claim 13, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the tuning using a different applied channel setting value.
Amendments to the Drawings

A Replacement Sheet for Figure 1 has been submitted to include a legend.
REMARKS

Claims 1, 2, 4-14, and 16-23 are pending.

The specification has been amended to delete the hyperlinks.

A Replacement Sheet for Figure 1 has been submitted to remove the drawing objection.

Claims 1-9, 13-18, 21, and 22 were rejected under 35 USC § 102(b) for being anticipated by the Arsenault patent. Applicants request the Examiner to withdraw this rejection for the following reasons.

The Arsenault patent discloses a method for tuning a digital receiver to the transponder of a satellite. This method involves selecting a port of a multi-switch and the comparing a network identifier and polarity information to stored network identifier and polarity information. (See column 7, lines 29-40). The comparison is different from the comparison performed by claims 1 and 13. Instead of comparing a network identifier and polarity, claims 1 and 13 recite performing a comparison based on the tuned signal itself.

More specifically, claim 1 has been amended to recite that operation (b) comprises:

“determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite;” and

“setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and, if there is no match, the method proceeds again to the operation (a) with the applied channel setting value removed.” The Arsenault patent also does not disclose these features, i.e., as indicated the Arsenault method compares network
identifiers and polarities, not the tuned signal to pre-stored information as recited in amended claim 1.

Because the Arsenault patent does not disclose all the features of claim 1, it is respectfully submitted that the Arsenault patent does not anticipate claim 1 or any of its dependent claims. Withdrawal of the § 102 rejection as applied to claim 1 is respectfully requested.

Claim 13 has been amended to recite features similar to those added to claim 1. Withdrawal of the § 102 rejection as applied to claim 13 and its dependent claims is requested.

Claims 12 and 23 were rejected under 35 USC § 103(a) for being obvious based on an Arsenault-Oh combination. Applicants traverse this rejection on grounds that the Oh patent does not teach or suggest the features added by amendment to claim 12.

For example, while Oh has been cited for disclosing simultaneously tuning tuners, Oh does not teach or suggest comparison of the tuned signal recited in claim 12 as well as other features added by amendment to this claim.

Based on these differences, it is submitted that claim 12 is allowable along with claim 23.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and timely allowance of the application is respectfully requested.
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 8638
Reston, VA 20195
703 766-3777

Date: December 5, 2011
Please direct all correspondence to Customer Number 34610
PRIOR ART

1/8
FIG. 1

start

110
display UI screen

120
set antenna in correspondence with inputted values

130
select tuner in correspondence with inputted values

140
channel search channel

150
successful?

no

end

yes
Docket No.: EZ-0004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Ho Yi; Seung-Kwan HA and Jun-Hyung KIM

Confirmation No.: 8310
Group Art Unit: 2421
Examiner: Gigi L. DUBASKY
Customer No.: 34610

Filed: October 15, 2007

For: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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: Petition for Extension of Time

The fee has been calculated as shown below:

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If multiple claims newly presented, add $450.00
Fee for extension of time

TOTAL FEE DUE $150.00

☐ 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
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Correspondence Address:
P.O. Box 8638
Reston, VA 20195
(703) 766-3777 DSYK/ SWN/k/f
Date: December 5, 2011

Please direct all correspondence to Customer Number 34610

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Ho Yi; Seung-Kwan Ha and Jun-Hyung Kim

Confirmation No.: 8310

Group Art Unit: 2421

Serial No.: 11/872,149

Examiner: Gigi L. Dubasky

Filed: October 15, 2007

Customer No.: 34610

For: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)(1)

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

Sir:

Applicant petitions the Commissioner of Patents and Trademarks to extend the time for response to the Office Action dated August 3, 2011 for (1) month from November 3, 2011 to December 3, 2011.

Please charge our credit card including the amount of $150.00 for the extension of time under 37 C.F.R. §1.17(a). Any deficiency or overpayment should be charged or credited to Deposit Account No. 16-0607.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186
Samuel W. Ntiro
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P.O. Box 8638
Reston, VA 20195
703 766-3777 DYE/SWN/kf

Date: December 5, 2011

Please direct all correspondence to Customer Number 34610

Q:\Documents\2309-004\306652
# Patent Application Fee Determination Record

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## Application as Amended - Part II

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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:
/NINA RATANAVONG/

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. 11/872,149
Applicant(s) YI ET AL.
Examiner GIGI L. DUBASKY
Art Unit 2421

--- 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 15 October 2007.
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) 1-23 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) 1-9,12-18 and 21-23 is/are rejected.
7) ☑ Claim(s) 10,11,19 and 20 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 15 October 2007 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) 4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date ______.
   Paper No(s)/Mail Date ______.
3) ☑ Information Disclosure Statement(s) (PTO/SB/08) 6) ☐ Other: ______.
   Paper No(s)/Mail Date ______.
DETAILED ACTION

Specification

1. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code (see Applicants’ specification last paragraph on page 19). Applicants are required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Drawings

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-9, 13-18 and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Arsenault (US 6980529).

Regarding claim 1, Arsenault discloses a one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:

(a) tuning a tuner (tuner 52 in Figure 3) corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value (Figure 4A and Col 6 line 14 through Col 7 line 18 for (step 422) tuning to currently selected one of satellite frequencies (as “satellite transponders”) after (step 404) selecting one of retrieved network identifiers, (steps 406 and 408) determining the need to find a particular polarity (i.e., left-hand or right-hand polarity) for the selected network identifier and (step 418 or 420) selecting one of untried multi-switch ports; and see step 432 in Figure 4B and Col 7 lines 47-58 for continuously tuning to the next one of satellite frequencies and looping back. In other words, Arsenault discloses tuning a tuner 52 corresponding to “a frequency: a network ID: a LH/RH polarity: a multi-switch port” (each of which meets “an applied channel setting
value”), which are selected from a combination of a plurality of retrieved network identifiers (network as one of “value factors”) associated with one or more satellite transponders (transponder as another of "value factors") and (LH and/or RH) polarities (LNB as another of “value factors”), and a plurality of available multi-switch ports (switch as another of “value factors”) (which meets “chosen from available channel setting values made from combinations of channel setting value factors”), and repeating the corresponding steps for all available satellite transponders (which meets “by referencing a transponder list corresponding to the applied channel setting value”) associated with the selected network identifier); and

(b) setting an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result (Col 6 lines 1-11 and Col 7 lines 19-28 for memorizing the association of current multi-switch port and an available particular network identifier and polarity (to be used to set an antenna and a tuner to receive available programs) in accordance with the tuning result of finding a predetermined marker pattern).

Regarding claim 2, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the operation (a) comprises: producing available channel setting values from combinations of channel setting value factors (Col 4 lines 30-40 and Col 6 lines 14-54 for retrieving information such as network information, i.e., network identifiers, transponders and LNB information and DiSEqC multi-switch port information (as “combinations of channel setting value
factors") from which to obtain network IDs, LH and RH polarities with or without 22 kHz, satellite frequencies and multi-switch input ports (as "available channel setting values"); choosing an applied channel setting value from the available channel setting values (steps 404, 406, 408, 416, 418 and 420 in Figure 4A for selecting one network ID, one polarity, one frequency and one multi-switch port from a plurality of network identifiers, from LH and RH polarities, from a plurality of satellite frequencies and from DiSEqc multi-switch input ports respectively); and tuning a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value (see step 422 in Figure 4A and Col 6 line 14 through Col 7 line 18 for tuning tuner 52 corresponding to the current satellite frequency selected from a list of satellite frequencies associated with selected network ID and LH/RH polarity and the selected untried multi-switch port).

Regarding claim 3, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite (Col 7 lines 16-33 for, if a marker pattern is received via the tuned signal of currently selected satellite frequency from satellite frequencies (as "the tuning is successful"), determining whether or not received network ID and polarity in the marker pattern of tuned signal of the current satellite frequency/transponder matches the currently seeking network ID and
polarity which are pre-stored in memory device - see Col 6 lines 14-26); and setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and if there is no match, the method proceeds again to the operation (a) with the applied channel setting value removed (see Figures 4A-B and Col 7 line 33 through Col 8 line 6 for, if the received network ID and polarity and the pre-stored and currently seeking one are the same (step 430), the program moves on to check the next network ID (loop back to step 410) (which means the association of found network ID, polarity and multi-switch port is recorded to set antenna and tuner to receive programs), and if they are different (step 430), the program keeps looking for the current network ID and polarity in associated additional frequencies (looping back to step 422) or scanning through all multi-switch ports (looping back to step 436) and skips (or removes) the received network ID and polarity as applied value on subsequent iteration of the program).

Regarding claim 4, Arsenault discloses the method as discussed in the rejection of claim 3. Arsenault further discloses proceeding again to the operation (a) with the applied channel setting value removed, if the tuning is unsuccessful (see step 424 in Figure 4A and from “no” branch to step 432 in Figure 4B for, if a marker pattern is not received via the tuned signal (as “the tuning is unsuccessful”), the program keeps looking for the current network ID and polarity in associated additional frequencies (looping back to step 422) or scanning through all multi-switch ports (looping back to
step 436) and skips (or removes) the received network ID and polarity as applied value on subsequent iteration of the program.

Regarding claims 5-6, Arsenault discloses the method as discussed in the rejection of claim 3. Arsenault further discloses wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder which are pre-stored in the digital broadcast receiver (Col 3 lines 41-47 for using MPEG-1 and MPEG-2 standard for video and audio signals in Arsenault's system which means PSI/SI is well-known included in MPEG transport stream (TP); Col 6 lines 1-8 for looking for a predefined marker pattern which includes data such as network identification, frequency identification and polarity type on a well-known service channel identifier (SCID) on a particular satellite frequency and polarity associated with a particular network identifier, which means that the data included in the marker pattern are PSI/SI data of transponder signal; Col 7 lines 31-33 for comparing the current stored network ID and polarity and the received network ID and polarity of the marker pattern; and Col 6 lines 14-25 for the network identifiers associated with satellite frequencies and LH and/or RH polarities are pre-stored in the internal RAM/ROM of the IRD).

Regarding claim 7, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information (Col 3 lines 1-7 for using one or more satellites; see
Figure 2 for using 4 LNB 50; and see Figure 3 for using two different tuners in which tuner 52 is for receiving satellite signals).

Regarding claim 8, Arsenault discloses the method as discussed in the rejection of claim 7. Arsenault further discloses the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used (Col 4 lines 30-44).

Regarding claim 9, Arsenault discloses the method as discussed in the rejection of claim 7. Arsenault further discloses the operation (a) is repeated for a number of all possible combinations of the available channel setting values (Col 2 lines 47-48).

Regarding claim 13, all functionalities of a digital broadcast receiver in claim 13 are analyzed and rejected corresponding to claim 1. Arsenault further discloses a tuner unit (tuner 52 and 35 in Figure 3), a control unit (microprocessor 58) and a storage unit (system RAM 70).

Regarding claim 14, all functionalities of a digital broadcast receiver in claim 14 are analyzed and rejected corresponding to claim 2.

Regarding claim 15, all functionalities of a digital broadcast receiver in claim 15 are analyzed and rejected corresponding to claim 3.
Regarding claim 16, all functionalities of a digital broadcast receiver in claim 16 are analyzed and rejected corresponding to claim 7.

Regarding claim 17, all functionalities of a digital broadcast receiver in claim 17 are analyzed and rejected corresponding to claim 8.

Regarding claim 18, all functionalities of a digital broadcast receiver in claim 18 are analyzed and rejected corresponding to claim 9.

Regarding claim 21, all functionalities of a digital broadcast receiver in claim 21 are analyzed and rejected corresponding to claim 5.

Regarding claim 22, all functionalities of a digital broadcast receiver in claim 22 are analyzed and rejected corresponding to claim 6.

Claim Rejections - 35 USC § 103

5. 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.
6. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arsenault (US 6980529) in view of Oh (US 7929062).

   Regarding claim 12, Arsenault discloses the method as discussed in the rejection of claim 1. Arsenault further discloses the digital broadcast receiver (IRD) has two tuners 52 and 35 (Figure 3). However, Arsenault fails to disclose each tuner is tuned simultaneously in the operation (a) using a different applied channel setting value.

   Oh discloses a digital broadcast receiver having a plurality of tuners (Figure 1) for performing channel scanning methods (title). Oh discloses each tuner is tuned simultaneously in a predetermined channel in sequential parallel scanning method (Col 7 lines 48-67) or in a predetermined channel of a respective allocated channel range in frequency range allocation scanning method (Col 9 lines 51-64).

   Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Arsenault’s system with the teaching of Oh using a plurality of tuners to simultaneously scan channels using different applied channel setting value such as different channel value or different channel in different frequency range value, so to increase the speed of scanning in channel configuration.

   Regarding claim 23, all functionalities of a digital broadcast receiver in claim 23 are analyzed and rejected corresponding to claim 12.
Allowable Subject Matter

7. Claims 10-11 and 19-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The arts of record either alone or in combination fails to particularly disclose or suggest the claimed limitation of "the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners" which is inclusive all mentioned factors as claimed in claim 10.

Claim 11 is depended on claim 10, so objected the same.

Claims 19 and 20 are analyzed corresponding to claims 10-11, so are objected with the same reason as in claims 10-11.

Conclusion

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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GIGI L. DUBASKY whose telephone number is (571)270-5686. The examiner can normally be reached on Monday through Thursday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KRISTINE L. KINCAID can be reached on 571-272-4063. 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.

GD

/KRISTINE KINCAID/
Supervisory Patent Examiner, Art Unit 2421
# Notice of References Cited

**U.S. PATENT DOCUMENTS**

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**FOREIGN 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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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)*

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CONFIRMATION NO. 8310

SERIAL NUMBER
11/872,149

FILING or 371(c) DATE
10/15/2007

CLASS
348

GROUP ART UNIT
2421

ATTORNEY DOCKET NO.
EZ-0004

APPLICANTS
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Seung-Kwan Ha, Seoul, KOREA, REPUBLIC OF;
Jun-Hyung Kim, Seongnam-si, KOREA, REPUBLIC OF;

** CONTINUING DATA ***********************

** FOREIGN APPLICATIONS ***********************
REPUBLIC OF KOREA 10-2006-0121905 12/05/2006

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
10/29/2007

Foreign Priority claimed Yes No
35 USC 119(a-d) conditions met Yes No

STATE OR COUNTRY
KOREA, REPUBLIC OF

SHEETS DRAWINGS
8
TOTAL CLAIMS
23
INDEPENDENT CLAIMS
2

ADDRESS
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Reston, VA 20195
UNITED STATES

TITLE
DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

FILING FEE RECEIVED
1310

FEES: Authority has been given in Paper No._________ to charge/credit DEPOSIT ACCOUNT No._________ for following:

- All Fees
- 1.16 Fees (Filing)
- 1.17 Fees (Processing Ext. of time)
- 1.18 Fees (Issue)
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BIB (Rev. 05/07)
### EAST Search History

#### EAST Search History (Prior Art)

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**FOREIGN PATENT DOCUMENTS**

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

/G.D./


EXAMINER /Gigi Dubasky/
DATE CONSIDERED 07/25/2011

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

\File/Documents/2309/2309-004/185880.doc

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.D./
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Ho Yi; Seung-Kwan Ha and Jun-Hyung Kim

Confirmation No.: 8310

Group Art Unit: 2622

Serial No.: 11/872,149

Examiner: David Louis OMETZ

Filed: October 15, 2007

Customer No.: 34610

For: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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. Applicant reserves 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 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. Attached is our check no. _____ in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p). Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information. Two duplicate copies of this paper are attached.

d. 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. Two duplicate copies of this paper are attached.

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.

a. Attached is our check no. _____ in the amount of $180.00 in payment of the fee under 37 C.F.R. §1.17(p). Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information. Two duplicate copies of this paper are attached. 37 C.F.R. §1.97(d).

b. 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. Two duplicate copies of this paper are attached. 37 C.F.R. §1.97(d).

c. 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 not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(c)(1).

d. 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(c)(2).

4. The references were cited in a corresponding European application. An English language version of the European Search Report dated December 11, 2008 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

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
Telephone: (703) 766-3777
Date: February 13, 2009

Please direct all correspondence to Customer Number 34640
### LIST OF ART CITED BY APPLICANT

(PTO-1449)

**ATTY. DOCKET NO.**  EZ-0004  
**APPLN. SERIAL NO.**  11/872,149

**APPLICANT(S)**  Ho Yi; Seung-Kwan HA and Jun-Hyung Kim

**FILING DATE**  October 15, 2007

**GROUP**  2622

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<td>Horr et al.</td>
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(54) Method for automatically detecting an antenna system for satellite receivers
Verfahren zur Autodetektion eines Antennensystems für einen Satellitenempfänger
Procédé d'auto-détexion de système d'antenne pour récepteur satellite

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Description

[0001] The invention relates to a method for automatically detecting an antenna system for satellite receivers.
[0002] Satellite television requires a special satellite receiver to receive the programmes broadcast by satellites, such receivers are generally called satellite decoders or STB (Set Top Box). Several satellites can be viewed from a given geographic location. Decoders are commercialised to be able to receive the signals coming from different satellites. It is therefore possible to couple a decoder to one or more fixed or rotating antennas to be able to receive the programmes from different satellites.
[0003] Figure 1 shows an example of a satellite installation that comprises a decoder 1 coupled to a television 2 to receive signals from two fixed antennas 3 and 4 and a motorised rotating antenna 5. The antennas 3 to 5 are connected to the decoder by a switch 6. To control this installation, the decoder must be configured to be informed that the installation has several antennas coupled to a switch and a minimum amount of knowledge of the antenna system used is required. Moreover, if one counts all the possibilities offered, the configuration menu becomes relatively complex and may require the presence of a specialist engineer. Moreover, if the antenna system is common to several decoders placed in a single building, an installer does not necessarily know the installation.
[0004] The invention proposes to make configuring the satellite decoders easier. An automatic detection method can configure the decoder without having to determine the installation beforehand. The automatic detection method tests different configuration possibilities in order to determine the configuration.
[0005] The invention is an method for automatically detecting an antenna system for satellite receivers that sends a series of input selection commands for a remote antenna switch corresponding to a given range of switch control possibilities, the said range being independent from the antenna system used.
[0006] Preferentially, the series of selection commands is sent with at least one series of frequency positioning controls carrying out a satellite band scan, the said positioning controls being inserted between the said selection commands. The series of selection commands is sent with frequency and polarisation positioning controls corresponding to memorized satellite service channels, the said positioning controls being inserted between the said selection commands. At least one azimuth motion control is sent independently from the presence or absence of an azimuth elevation motorised antenna. At least one azimuth motion control sequence is sent independently from the presence or absence of an azimuth elevation motorised antenna.
[0007] The invention will be better understood, and other specific features and advantages will emerge from reading the following description, the description making reference to the annexed drawings wherein:

figure 1 shows an example of a satellite receiver installation,
figures 2 to 4 show the different flow diagrams used by a preferred method realized according to the invention.

[0008] The method according to the invention can detect the entire installation constituting an antenna system to which a decoder is connected. The decoder itself will carry out a complete analysis of the system and automatically configure itself. Figure 2 shows an overall auto-configuration flow diagram that comprises a first switch detection phase 100, a second motorised antenna detection phase 200 and a third satellite and channel identification phase 300. This flow diagram corresponds to an auto-configuration program that is run by a processor of the decoder. The user only has to run the auto-configuration of the decoder and wait, which is relatively simple.

[0009] Firstly, it should be remembered that the DiSEqC standard is a standard that enables commands to be transmitted to an antenna system. Among the DiSEqC commands, it must be recalled that they comprise:

- commands for the antenna transposition circuit commonly called LNB (Low Noise Block) that can select the polarisation of the waves received and the part of the satellite band transposed into intermediate band,
- switch commands that enable a switch to be addressed, or cascaded switches enabling up to four inputs to be addressed, commonly called A, B, C and D,
- motion commands for mobile azimuth elevation motorised antennas.

[0010] The DiSEqC standard is the standard most used for satellite reception antenna but other commands can also be used. In the present description, abstraction is made of there being several types of command other than the DiSEqC standard in order not to make the description unnecessarily cumbersome. Since, as those skilled in the art will note, the method implemented considers in its first approach that all the possibilities offered are used.

[0011] For DiSEqC, it is possible to have up to four switched antennas. In the detection method that will be detailed hereafter, four variables representative of any switch input(s) will be used: Input A, Input B, Input C and Input D, each of these variables can have the value "1" representative of the presence of this input on a switch, or the value "0" representative of the absence of the input. Considering that for each entry, it is possible to have a fixed or motorised antenna or no antenna, each possible switch input is assigned a signal variable: Signal A, Signal B, Signal C and Signal D, each of these variables being able to take the value "0" representative of the absence
of the antenna, the value "1" representative of a fixed antenna or even the value "2" representative of a motorised antenna.

[0012] Before running the auto-configuration, it is considered that there are switches with four inputs, the input A, input B, input C and input D variables are all set to the state "1".

[0013] Phase 100 is first carried out, in which only switches with fixed antennas are considered. During the first step 101, the command that selects input A is sent, if there is a switch, this switch will be set to the corresponding input, otherwise this command will have no effect. Next, a second step 102 is carried out that consists of performing a rapid scan of the satellite band. The rapid scan is for example realised by using a relatively large pitch or only on frequencies and polarisations corresponding to the service channels of each known satellite, this step terminates after scanning the entire band (or all the tested frequencies) or as soon as a channel is found.

[0014] If no channel has been found at the end of the second step 102, then the Signal "A" variable is marked as equal to "0" during a third step 103. Then, during a fourth step 104, a selection command of an input B is sent. Then a fifth scanning step 105 identical to the second step 102 is carried out.

[0015] If, at the end of the fifth step 105, no channel has been found, then the Signal B variable is marked as equal to "0" during a sixth step 106. Then, during a seventh step 107, a selection command of an input C is sent. Then an eighth scanning step 108 identical to the second step 102 is carried out.

[0016] If no channel has been found at the end of the eighth step 108, then the Signal C variable is marked as equal to "0" during a ninth step 109. Then, during a tenth step 110, a selection command of an input D is sent. Then an eleventh scanning step 111 identical to the second step 102 is carried out.

[0017] If no channel has been found at the end of step 111, the Signal D variable is marked as equal to "0" during a twelfth step 112.

[0018] If a channel was found at the end of step 102, the Signal A variable is marked as equal to "1" during a thirteenth step 113. Still during the third step 113, information relating to the channel received is memorized, among other things the identification of the channel but also the receiver power, error rate and possibly equalization parameters. Then, during a fourteenth step 114, the selection command of an input B is sent, without changing the channel selected. If, just after selecting input B, a signal is received that corresponds to the same signal as signal A whose parameters are memorized, then the input B variable is marked as equal to "0" during a fifteenth step 115. Indeed, if for the same channel polarization and frequency, the channel received is the same with the same power and equalization parameters, then this can only be the same antenna so the input the selection command of the input B is without effect and there is therefore no input B. Then, during a sixteenth step 116, the input C selection command is sent without changing the channel selected. If, just after selecting input C, a signal is received that corresponds to the same signal as signal A whose parameters are still memorized, then the input C variable is marked as equal to "0" during a seventeenth step 117. Then, during an eighteenth step 118, the selection command of the input D is sent, without changing the channel selected. If, just after selecting input D, a signal is received that corresponds to the same signal as signal A whose parameters are still memorized, then the Input D variable is marked as equal to "0" during a nineteenth step 119.

[0019] However, if no signal, or a different signal from the one memorized, is received after the fourteenth step 114 then the fifth step 105 is carried out.

[0020] If, a channel is found at the end of the fifth step 105, then the Signal B variable is marked as being equal to "1" during a twentieth step 120. During the twentieth step 120, the information relating to the channel received is memorized, in an identical manner to that of the thirteenth step 113. Then, during a twenty-first step 121, the selection command of an input C is sent without changing the channel selected. If, just after selecting input C, a signal is received that corresponds to the same signal as signal B whose parameters are still memorized, then the input C variable is marked as equal to "0" during the seventeenth step 117. Then, during an eighteenth step 118, the input D selection command is sent without changing the channel selected. If, just after selecting input D, a signal is received that corresponds to the same signal as signal B whose parameters are still memorized, then the input D variable is marked as equal to "0" during a nineteenth step 119.

[0021] However, if no signal, or a different signal from the one memorized, is received after the twenty-first step 121, then the eighth step 108 is carried out.

[0022] If, a channel is found at the end of the eighth step 108, then the Signal C variable is marked as being equal to "1" during a twenty-second step 122. During the twenty-second step 122, the information relating to the channel received is memorized, in an identical manner to that of the thirteenth step 113. Then, during a twenty-third step 123, the selection command of an input D is sent without changing the channel selected. If, just after selecting input D, a signal is received that corresponds to the same signal as signal C whose parameters are still memorized, then the input D variable is marked as equal to "0" during a nineteenth step 119.

[0023] However, if no signal, or a different signal from the one memorized, is received after the twenty-third step 123, then the eleventh step 111 is carried out.

[0024] If a channel has been found at the end of step 111, the Signal D variable is marked as equal to "1" during a twenty-fourth step 124.

[0025] Normally, if a switch is present, it has two or four switched inputs or may comprise two or three switches with two cascaded inputs. The manner in which the selection command is composed means that, normally,
input A is always an input used as soon as a switch is also used, it is possible to consider the first phase 100 as being terminated at the end of the twelfth step 112, the nineteenth step 119 or the twenty-fourth step 124. If the signal A variable equals "1", this means that there is indeed an input A. If the input B, Input C and input D variables are all equal to "0", this means that there is no switch.

[0026] The switches are normally identified at the end of the first phase 100. However, it is possible that the final result is not reliable, as one or more motorised antennas can be present without however pointing to a satellite. If, for example, all the Signal A to D variables are equal to "0", it is not possible to determine whether this is because the inputs are not connected to antennas or whether one or more motorised antennas are present, hence the necessity of repeating the first phase 100 in this specific case after the detection of a motorized antenna.

[0027] The second phase 200 comprises a first type of processing in the case that all the Signal A to D variables are equal to "0" and a second type of processing in the other case.

[0028] If all of the Signal A to D variables are equal to "0", then input A is selected during a first step 201. Azimuth scanning is then carried out during a second step 202. Azimuth scanning consists of sending an instruction to set the antenna to the end of its travel, for example to the east, of sending instructions to the LNB to set the polarisation and the frequency band on a band in which there is at least one service channel for at least one satellite, of setting the tuner and demodulator of the receiver on a service channel then of sending instructions to move it toward the opposite end, for example to the west, until the other and is reached or a signal is detected that is not necessarily the one that corresponds to the required channel.

[0029] If a signal is detected at the end of the second step 202, then a third step 203 is carried out that consists of re-running the first phase 100, thus ending the second phase 200.

[0030] If no signal is detected at the end of the second step 202, then a fourth step 204 is carried out. The fourth step 204 consists in selecting the input B. Then, a fifth step 205 realises an azimuth scanning, in the same manner as in the second step 202.

[0031] If a signal is detected at the end of the fifth step 205, then a sixth step 206 is carried out that consists in re-running the first phase 100, thus ending the second phase 200.

[0032] If no signal is detected at the end of the fifth step 205, then a seventh step 207 is carried out. The seventh step 207 consists in selecting the input C. Then, an eighth step 208 realises an azimuth scanning, in the same manner as in the second step 202.

[0033] If a signal is detected at the end of the eighth step 208, then a ninth step 209 is carried out that consists in re-running the first phase 100, thus ending the second phase 200.

[0034] If no signal is detected at the end of the eighth step 208, then a tenth step 210 is carried out. The tenth step 210 consists in selecting the input B. Then, an eleventh step 211 realises an azimuth scanning, in the same manner as in the second step 202.

[0035] If a signal is detected at the end of the eleventh step 211, then a twelfth step 212 is carried out that consists in re-running the first phase 100, thus ending the second phase 200.

[0036] If no signal is detected at the end of the eleventh step 211, then a thirteenth step 213 is carried out. The thirteenth step 213 consists of displaying to the user that no antenna has been detected and that the correct connection of the antenna input of the decoder to a satellite antenna system must be checked. This thirteenth step ends the second phase 200 and also the auto-configuration program without carrying out the third phase 300.

[0037] If at least one of the Signal A to D variables is not equal to "0", then systematic detection is performed for each input whose Input A to D variable is equal to "1".

[0038] If the Input A variable equals "1", then a fourteenth step is carried out that selects the input A. Then, if the Signal A variable equals "0" then a fifteenth step 215 is carried out, otherwise a sixteenth step 216 is carried out. The fifteenth step 215 is an azimuth scanning step of the same type as the second step 202. The sixteenth step 216 consists of memorising the channel received then sending a motion command of an angle greater than the opening of a satellite antenna, for example, 3° to the east or west.

[0039] At the end of the fifteenth step 215, a check that a signal is received is made. If a signal is received, then the Signal A variable is set to the value "2" during a seventeenth step 217. If no signal is received, then the Signal A variable is set to the value "0" during an eighteenth step 218.

[0040] At the end of the sixteenth step 216, a check is made on whether a signal received corresponds to the channel previously received; if this is the case, the antenna has not moved and therefore it is fixed. If a signal is received, then the Signal A variable is set to the value "1" during a nineteenth step 219. If no signal is received, then the Signal A variable is set to the value "2" during the seventeenth step 217.

[0041] If the Input A variable does not equal "1" or the seventeenth, eighteenth or nineteenth step 217 or 218 or 219 is finished, then a check is made on whether the Input B variable equals "1". If the Input B variable equals "1", then a twentieth step 220 is carried out that selects the input B. Then, if the Signal B variable equals "0", a twenty-first step 221 is carried out, otherwise a twenty-second step 222 is carried out. The twenty-first step 221 is an azimuth scanning step of the same type as the second step 202. The twenty-second step 222 consists of memorising the channel received and sending a motion command identical to the sixteenth step 216.

[0042] At the end of the twenty-first step 221, a check
that a signal is received is made. If a signal is received, then the Signal B variable is set to the value "2" during a twenty-third step 223. If no signal is received, then the Signal B variable is set to the value "0" during a twenty-fourth step 224.

[0043] At the end of the twenty-second step 222, a check is made on whether a signal received corresponds to the channel previously received; if this is the case, the antenna has not moved and therefore it is fixed. If a signal is received, then the Signal B variable is set to the value "1" during a twenty-fifth step 225. If no signal is received, then the Signal B variable is set to the value "2" during the twenty-third step 223.

[0044] If the input B variable does not equal "1" or the twenty-third, twenty-fourth or twenty-fifth step 223 or 224 or 225 is finished, then a check is made on whether the Input C variable equals "1". If the input C variable equals "1" then a twenty-sixth step 226 is carried out that selects the input C. Then, if the Signal C variable equals "0" a twenty-seventh step 227 is carried out, otherwise a twenty-eighth step 228 is carried out. The twenty-seventh step 227 is an azimuth scanning step of the same type as the second step 202. The twenty-eighth step 228 consists of memorising the channel received then sending a motion command identical to the sixteenth step 216.

[0045] At the end of the twenty-seventh step 227, a check that a signal is received is made. If a signal is received, then the Signal C variable is set to the value "2" during a twenty-ninth step 229. If no signal is received, then the Signal C variable is set to the value "0" during a thirtieth step 230.

[0046] At the end of the twenty-eighth step 228, a check is made on whether a signal received corresponds to the channel previously received; if this is the case, the antenna has not moved and therefore it is fixed. If a signal is received, then the Signal C variable is set to the value "1" during a thirty-first step 231. If no signal is received, then the Signal C variable is set to the value "2" during the twenty-ninth step 229.

[0047] If the input C variable does not equal "1" or the twenty-ninth, thirtieth or thirty-first step 229 or 230 or 231 is finished, then a check is made on whether the Input D variable equals "1". If the input D variable equals "1" then a thirty-second step 232 is carried out that selects the input D. Then, if the Signal D variable equals "0" a thirty-third step 233 is carried out, otherwise a thirty-fourth step 234 is carried out. The thirty-third step 233 is an azimuth scanning step of the same type as the second step 202. The thirty-fourth step 234 consists of memorising the channel received then sending a motion command identical to the sixteenth step 216.

[0048] At the end of the thirty-third step 233, a check that a signal is received is made. If a signal is received, then the Signal D variable is set to the value "2" during a thirty-fifth step 235. If no signal is received, then the Signal D variable is set to the value "0" during a thirty-sixth step 236.

[0049] At the end of the thirty-fourth step 234, a check is made on whether a signal received corresponds to the channel previously received; if this is the case, the antenna has not moved and therefore it is fixed. If a signal is received, then the Signal D variable is set to the value "1" during a thirty-seventh step 237. If no signal is received, then the Signal D variable is set to the value "2" during the thirty-fifth step 235.

[0050] If the input D variable is not equal to "1" or the thirty-fifth, thirty-sixth or thirty-seventh step 235 or 236 or 237 is finished, then the second phase 200 ends and the third phase 300 can be carried out.

[0051] The third phase 300 comprises a first part of formatting the detection realized during the first and second phases 100 and 200 then a second part of identifying the satellite channels as already known from the configuration information coming from the detection.

[0052] As indicated above, if the input B, input C and input D variables equal "0", this means that there is no switch and therefore that the decoder is connected to an antenna that is fixed if the Signal A variable equals "1" or that is a motorised antenna if the Signal A variable equals "2".

[0053] In the other cases, this means that there is at least one antenna switch. It is possible to consider, systematically, a four-input switch as the instructions for a four-input switch are supported by two-input switches or to distinguish between the different cases possible: a two-input switch controlled at A and B or at A and C, two cascaded switches offering three inputs controlled at A-B-C or at A-C-D or at A-B-D, and one four-input switch or three cascaded two-input switches controlled at A-B-C-D. The switches are identified according to Input A to D variables that are at "1" at the end of the second phase. For the inputs whose Input A to D variables are at "1", it is sufficient to indicate that no antenna is connected to the input of the switch if the Signal A to D variable associated with the said input is equal to "0", or to indicate that a fixed antenna is connected to the input of the switch if the Signal A to D variable associated with the said input is equal to "1", or even indicate that a motorised antenna is connected to the input of the switch if the Signal A to D variable associated with the said input is equal to "2".

[0054] Once the status of the antenna system is correctly updated, it is possible to move on to the identification of the satellite and channels. For fixed antennas, the entire satellite band is scanned according to a known technique to find all of the accessible channels, the channels are then memorized by indicating, if necessary, the switch control signal to be used to select it. For each motorised antenna, a rough scan of the satellite band is carried out while azimuth scanning with the antenna so as to identify the positions of the antenna that correspond to satellites according to a known technique, then for each satellite found, a satellite band scan is carried out to identify the channels. The channels are then memorized with the angular position of the antenna and possibly the switch input selection command.
8. Method according to one of claims 5 to 7, characterized in that it comprises, after a second phase (200), a third channel and satellite identification phase (300) in which at least one full scan of the satellite band is carried out for at least one antenna.

9. Method according to one of claims 1 to 8, characterized in that the commands are commands that comply with the DiSeQc standard.

Patentansprüche


3. Verfahren nach einem der Ansprüche 1 bis 2, dadurch gekennzeichnet, dass mindestens ein Nachführungsbefehl (216, 222, 228, 234) unabhängig von dem vorhandenen oder Nichtvorhandensein einer motorisierten dreh- und schwenkbaren Antenne gesendet wird.


5. Verfahren nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass es mindestens eine erste Schallektionsphase (100) und mindestens eine zweite Detektionsphase (200) einer motorisierten Antenne umfasst.
6. Verfahren nach Anspruch 5, wenn er von Anspruch 3 oder Anspruch 4 abhängt, dadurch gekennzeichnet, dass die Bewegungssteuerungen (202, 205, 208, 211, 215, 216, 221, 222, 227, 228, 233, 234) während der zweiten Phase (200) gesendet werden.
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7. Verfahren nach Anspruch 5, wenn er von Anspruch 1 oder von Anspruch 2 abhängt, dadurch gekennzeichnet, dass die Positionierungssteuerungen (102, 105, 108, 111) während der ersten Phase (100) gesendet werden.
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8. Verfahren nach einem der Ansprüche 5 bis 7, dadurch gekennzeichnet, dass es nach einer zweiten Phase (200) eine dritte Phase (300) der Kanal- und Satellitenidentifizierung umfasst, während welcher mindestens eine volle Abtastung des Satellitenbandes für mindestens eine Antenne ausgeführt wird.
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9. Verfahren nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass die Befehle aus Befehlen bestehen, die dem DiSEqC-Standard entsprechen.
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Revendications

1. Procédé d'auto-détectio
n de système d'antenne caractérisé en ce qu'il envoie une série de commandes de sélection d'entrée (101, 104, 107, 110, 114, 116, 118, 121, 123, 201, 204, 207, 210, 214, 220, 226, 232) pour commutateur d'antenne distant correspondant à un éventail donné de possibilités de commande de commutateur, le plus éventail étant indépendant du système d'antenne utilisé, et au moins une série de commandes de positionnement (102, 105, 108, 111) de fréquence effectuant un balayage de bande satellite, lesdites commandes de positionnement étant intercalées entre lesdites commandes de sélection.
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2. Procédé selon la revendication 1, caractérisé en ce que la série de commandes de sélection (101, 104, 107, 110, 114, 116, 118, 121, 123) est envoyée avec des commandes de positionnement (102, 105, 108, 111) en fréquence et en polarisation correspondant à des canaux de service de satellite mémorisé, lesdites commandes de positionnement étant intercalées entre lesdites commandes de sélection.
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3. Procédé selon l'une des revendications 1 à 2, caractérisé en ce qu'il au moins une commande de déplacement en azimut (216, 222, 228, 234) est envoyée indépendamment de la présence ou de l'absence d'une antenne motorisée en azimut.
40

4. Procédé selon l'une des revendications 1 à 2, caractérisé en ce qu'il au moins une succession de commandes de déplacement en azimut (202, 205, 208, 211, 215, 221, 227, 228, 233, 234) est envoyée indépendamment de la présence ou de l'absence d'une antenne motorisée en azimut.
45

5. Procédé selon l'une des revendications 1 à 4, caractérisé en ce qu'il comporte au moins une première phase (100) de détection de commutateur et au moins une deuxième phase (200) de détection d'antenne motorisée.
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6. Procédé selon la revendication 5 lorsqu'elle dépend de la revendication 3 ou de la revendication 4, caractérisé en ce que les commandes de déplacement (202, 205, 208, 211, 215, 216, 221, 222, 227, 228, 233, 234) sont envoyées pendant la deuxième phase (200).
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7. Procédé selon la revendication 5 lorsqu'elle dépend de la revendication 1 ou de la revendication 2, caractérisé en ce que les commandes de positionnement (102, 105, 108, 111) sont envoyées pendant la première phase (100).

8. Procédé selon l'une des revendications 5 à 7, caractérisé en ce qu'il comporte, après une deuxième phase (200), une troisième phase (300) d'identification de canaux et de satellites dans laquelle au moins un balayage complet de la bande satellite est effectué pour au moins une antenne.

9. Procédé selon l'une des revendications 1 à 8, caractérisé en ce que les commandes sont des commandes conformes au standard DiSEqC.
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**Title of Invention:** DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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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.
APPLICATION NUMBER | FILING OR 371(e) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE
---|---|---|---
11/872,149 | 10/15/2007 | Ho Yi | EZ-0004

CONFIRMATION NO. 8310

34610
KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, VA 20153-1200

Title: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

Publication Date: 06/05/2008

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Pre-Grant Publication Division, 703-605-4283
Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections.

Applicant(s)

Ho Yi, Seongnam-si, KOREA, REPUBLIC OF;
Seung-Kwan Ha, Seoul, KOREA, REPUBLIC OF;
Jun-Hyung Kim, Seongnam-si, KOREA, REPUBLIC OF;

Power of Attorney: The patent practitioners associated with Customer Number 34610

Domestic Priority data as claimed by applicant

Foreign Applications

REPUBLIC OF KOREA 10-2006-0121905 12/05/2006

If Required, Foreign Filing License Granted: 10/29/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 11/872,149

Projected Publication Date: 06/05/2008

Non-Publication Request: No

Early Publication Request: No
PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process simplifies the filing of patent applications on the same invention in member countries, but does not result in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application’s filing receipt contains further information and guidance as to the status of applicant’s license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help “toolkits” giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED
The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as
set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Ho Yi; Seung-Kwan Ha and Jun-Hyung Kim

Confirmation No.: 8310

Group Art Unit: 2622

Serial No.: 11/872,149

Examiner: To Be Assigned

Filed: October 15, 2007

Customer No.: 34610

For: DIGITAL BROADCAST RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

REPLY TO NOTICE TO FILE MISSING PARTS OF APPLICATION

FILING DATE GRANTED

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 October 30, 2007, submitted herewith are the following documents for filing in the above-referenced application:

- Declaration and Power of Attorney.
- Filing Fee of $1,030.00.
- Additional claim fee of $150.00.
- Late filing surcharge of $130.00 (large entity) $65.00 (small entity).
- Transmittal of certified priority document(s).
- Copy of Form PTO-1533 (Notice of Missing Parts).
- Authorization to Treat a Reply as Incorporating An Extension of Time under 37 C.F.R. §1.136(a)(3).
- A check in the amount of $_______ (Check #_______) is enclosed.
- Please charge my Credit Card in the amount of $1,310.00.
- Verified English language translation.
- Surcharge for filing non-English Specification $130.00 (large entity) $65.00 small entity.
- Assignment Recordation Coversheet and Assignment.
- A check in the amount of $40.00 (Check #_____)
Please charge my Credit Card $40.00, representing the recordation fee for the Assignment. (See completed form PTO-2038 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,
KED & ASSOCIATES, LLP

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

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
703 766-3777  DYK/dak

Date: December 21, 2007
Please direct all correspondence to Customer Number 34610

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Ho Yi; Seung-Kwan HA and Jun-Hyung KIM

Confirmation No.: 8310

Group Art Unit: 2622

Serial No.: 11/872,149

Examiner: To Be Assigned

Filed: October 15, 2007

Customer No.: 34610

For: DIGITAL BROADCAST RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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,
KED & ASSOCIATES, LLP

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

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
703 766-3777

Date: December 21, 2007

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 entitled DIGITAL BROADCAST RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD, the specification of which

☐ is attached hereto  ☒ was filed on October 15, 2007 as Application Serial No. 11/872,149 and was amended on (if applicable)

I hereby state that I have reviewed and understand 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 Title 37, Code of Federal Regulations, Section 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(g) 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):

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I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s):

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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. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

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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 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 or 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
Full name of sole or first inventor: Ho YI
Inventor's signature: [Signature] Date: [Nov 20, 2007]
Mailing Address: #103-604 Kkachi Mael, 77, Gumi-dong, Bungdang-gu, Seongnam-si, Gyeonggi-do 463-500, Republic of Korea
Citizenship: Republic of Korea
Residence Address
(only if different from mailing address):

Full name of joint inventor(s): Seung-Kwan HA
Inventor's signature: [Signature] Date:
Mailing Address: 42-145, Mia-dong, Gangbuk-gu, Seoul 142-100, Republic of Korea
Citizenship: Republic of Korea
Residence Address
(only if different from mailing address):

Full name of joint inventor(s): Jun-Hyung KIM
Inventor's signature: [Signature] Date: [Nov 2] 2007
Mailing Address: #1-207 Sejong Grancia Officeotel, 187-3, Gumi-dong, Bundang-gu, Seongnam-si, Gyeonggi-do 463-500, Republic of Korea
Citizenship: Republic of Korea
Residence Address
(only if different from mailing address):

Full name of joint inventor(s):
Inventor's signature: Date:
Mailing Address:
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Inventor's signature: Date:
Mailing Address:
Citizenship:
Residence Address
(only if different from mailing address):
Full name of sole or first inventor: Ho YI

Inventor's signature: Date:

Mailing Address: #103-604 Kkachi Maeul, 77, Gumi-dong, Bungdang-gu, Seongnam-si, Gyeonggi-do 463-500, Republic of Korea

Citizenship: Republic of Korea

Residence Address

(only if different from mailing address):

Full name of joint inventor(s): Seung-Kwan HA

Inventor's signature: Date: Nov 30, 2007

Mailing Address: 42-145, Mia-dong, Gangbuk-gu, Seoul 142-100, Republic of Korea

Citizenship: Republic of Korea

Residence Address

(only if different from mailing address):

Full name of joint inventor(s): Jun-Hyung KIM

Inventor's signature: Date:

Mailing Address: #1-207 Sejong Grancia Officetcl, 187-3, Gumi-dong, Bundang-gu, Seongnam-si, Gyeonggi-do 463-500, Republic of Korea

Citizenship: Republic of Korea

Residence Address

(only if different from mailing address):

Full name of joint inventor(s):

Inventor's signature: Date:

Mailing Address:

Citizenship:

Residence Address

(only if different from mailing address):

Full name of joint inventor(s):

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**Title of Invention:** DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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**Payment information:**
- Submitted with Payment: yes
- Payment Type: Credit Card
- Payment was successfully received in RAM: $1310
- RAM confirmation Number: 1411
- Deposit Account
- Authorized User

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**Warnings:**

**Information:**

| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 8618 | no | 2 |

**Total Files Size (in bytes):** 793428

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/OE/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

Application of Ho Yi, Seung-Kwan Ha and Jun-Hyung Kim

Confirmation No.: 8310
Group Art Unit: 2622

Serial No.: 11/872,149
Examiner: To Be Assigned

Filed: October 15, 2007
Customer No.: 34610

For: DIGITAL BROADCAST RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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,
KED & ASSOCIATES, LLP

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

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
703 766-3777

Date: December 21, 2007
Please direct all correspondence to Customer Number 34610

\\Fk4\Documents\2309\2309-004\143587.doc
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: 10-2006-0121905

Filing Date: Dec 05, 2006

Applicant(s): 주식회사 휴맥스

Commissioner: 2007년 08월 03일

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Issue Date: 2007.08.03
【서지사항】
【서류명】 서지사항 보정서
【수신처】 특허청장
【제출일자】 2006.12.11
【제출인】 주식회사 휴맥스
【출원인코드】 1-1998-000063-1
【사건과의 관계】 출원인
【대리인】 이경란
【대리인코드】 9-1998-000651-6
【보괄위임등록번호】 2004-073908-7
【사건의 표시】
【출원번호】 10-2006-0121905
【출원일자】 2006.12.05
【심사청구일자】 2006.12.05
【발명의 명칭】 디지털 방송 수신기 및 원터치 채널 설정 방법
【제출원인】
【접수번호】 1-1-2006-0899998-79
【접수일자】 2006.12.05
【보정할 서류】 특허출원서
【보정할 사항】
【보정대상항목】 발명자
【보정방법】 정정
【보정내용】
【발명자】
【성명】 이호
【성명의 영문표기】 Yi, Ho
【주민등록번호】 791225-1XXXXXX
【우편번호】 463-500
【주소】 경기 성남시 분당구 구미동 77번지 까치마을 103동 604호
【국적】 KR

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【성명】 하승관
【성명의 영문표기】 Ha, Seungkwan
【주민등록번호】 790719-1XXXXXX
【우편번호】 142-100
【주소】 서울특별시 강북구 미아동 42-145
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【발명자】
【성명】 김준형
【성명의 영문표기】 Kim, JunHyung
【주민등록번호】 760222-1XXXXXX
【우편번호】 463-500
【주소】 경기도 성남시 분당구 구미동 187-3 세종그랑시아 1동 207호
【국적】 KR

【취지】 「특허법 시행규칙」 제13조 · 「실용신안법 시행규칙」 제17조의 규정에 의하여 위와 같이 제출합니다.

대리인 이경란 (인)

【수수료】
【보정료】 0 원
【기타 수수료】 0 원
【합계】 0 원
【첨부서류】  1. 기타첨부서류 [사유서] 1통

3-3
【서지사항】
【서류명】 특허출원서
【권리구분】 특허
【수신처】 특허청장
【제출일자】 2006. 12. 05
【발명의 국문명칭】 디지털 방송 수신기 및 원터치 채널 설정 방법
【발명의 영문명칭】 DIGITAL BROADCASTING RECEIVER AND ONE TOUCH CHANNEL SETTING METHOD
【출원인】
【명칭】 주식회사 휴맥스
【출원인코드】 1-1998-000063-1
【대리인】
【성명】 이경란
【대리인코드】 9-1998-000051-6
【포괄위임등록번호】 2004-073908-7
【발명자】
【성명】 이호
【성명의 영문표기】 Yi, Ho
【주민등록번호】 791225-1XXXXXX
【우편번호】 463-500
【주소】 경기도 성남시 분당구 구미동 77번지 까치마을 103동 604호
【국적】 KR
【심사청구】 청구
【취지】 특허법 제42조의 규정에 의한 출원, 특허법 제60조의 규정에 의한 심사청구를 합니다.

대리인

이경란 (인)

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【요약서】

【요약】

디지털 방송 수신기 및 원터치 채널 설정 방법이 개시된다. 디지털 방송 수신기는 채널을 설정하기 위해, 채널 설정을 위한 요소들을 이용하여 조합 가능한 가용 채널 설정 값 중 어느 하나의 적응 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 상기 적응 채널 설정 값에 상응하는 튜너를 튜닝시키고, 상기 튜닝 결과에 따라 상기 적응 채널 설정 값에 상응하도록 안테나 및 튜너를 설정한다. 따라서, 자동으로 안테나 및 튜너를 설정하여 채널을 검색할 수 있다.

【대표도】

도 6

【색인어】

트랜스폰더, 다이렉 스위치, 채널설정, 튜너
【명세서】

【발명의 명칭】
디지털 방송 수신기 및 원터치 채널 설정 방법 (DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD)

【도면의 간단한 설명】

<1> 도 1은 복수 개의 튜너(tuner)가 구비된 디지털 방송 수신기의 일반적인 채널 탐색 과정을 나타낸 효름도.

<2> 도 2는 본 발명의 일 실시예에 따른 가용 채널 설정 값의 구성 요소를 설명한 표.

<3> 도 3 내지 도 5는 디지털 방송 수신기에 연결된 위성 내의 메뉴 목록을 도시한 도면.

<4> 도 6은 본 발명의 일 실시예에 따른 디지털 방송 수신기에서의 원터치 채널 설정 과정을 도시한 효름도.

<5> 도 7은 본 발명의 다른 실시예에 따른 디지털 방송 수신기에서의 원터치 채널 설정 과정을 도시한 효름도.

<6> 도 8은 본 발명의 일 실시예에 따른 디지털 방송 수신기의 블록 구성도.

<7> <도면의 주요 부분에 대한 부호 설명>

<8> 10 : 튜너부
<9> 20 : 제어부

<10> 30 : 트랜스폰더 정보 저장부

<11> 40 : 채널 정보 저장부

【발명의 상세한 설명】

【발명의 목적】

【발명이 속하는 기술분야 및 그 분야의 종래기술】

본 발명은 채널 설정에 관한 것으로서, 좀 더 상세하게는 디지털 방송 수신기 및 원터치 채널 설정 방법에 관한 것이다.

일반적으로 디지털 방송 수신기는 디지털 방송 프로그램을 하드디스크(HDD)와 같은 기록 매체에 기록 저장하는 개인 비디오 녹화 기능이 구비되어 있으며, 위성 방송 안테나와 텔레비전에 연결 접속될 수 있다. 이러한 디지털 방송 수신기는 사용자가 하나의 채널을 시청하면서, 다른 채널을 화면 속 화면 (picture in picture, PIP)으로 시청하거나 다른 채널을 녹화할 수 있도록 복수 개의 튜너를 사용하기도 한다.

또한, 디지털 방송 수신기는 채널 탐색 기능이 있는데 이는 사용자가 디지털 방송 수신기를 구입한 후 가장 먼저 수행해야 할 기능이며, 사용 중에도 변경된 채널 정보를 다시 등록하기 위하여 주기적으로 사용하는 기능이다.

도 1은 복수 개의 튜너가 구비된 디지털 방송 수신기의 일반적인 채널 탐색
과정을 나타낸 순서도이다.

도 1을 참조하면, 먼저 단계 110에서 디지털 방송 수신기는 사용자로부터 채널 설정 조건을 입력 받기 위한 UI 화면을 표시한다.

단계 120에서 디지털 방송 수신기는 UI 화면을 통하여 안테나의 세팅 조건인 위성 정보(예컨대, 위성 명 등), LNB 정보(예컨대, LNB 주파수, 전압 등), 22 KHz 톤(Tone)의 사용 여부(on/off) 및 다이렉 스위치(Diseqc switch) 값 등 중에서 하나 이상을 입력하여 안테나를 세팅한다.

안테나 세팅 후, 단계 130에서 디지털 방송 수신기는 복수 개의 튜너에 대하여 어느 튜너에 탐색할 안테나가 연결되어 있는지 지정해 주어야 하는데, 이를 "튜너 지정"이라고 한다.

단계 140에서 디지털 방송 수신기는 튜너 지정 후에 탐색할 트랜스폰더(Transponder; TP) 정보를 이용하여 "채널을 탐색"한다.

단계 150에서는 디지털 방송 수신기가 채널 탐색이 성공적으로 수행되기는지를 판단한다. 만일 채널 탐색이 수행되지 않는다면 이는 안테나 세팅 조건 및 지정된 튜너 중 하나 이상이 잘못 설정된 것이므로, 디지털 방송 수신기는 단계 110으로 되돌아가 채널 탐색에 실패하였음을 알리고 새로운 명령을 입력 받기 위한 UI 화면을 표시한다.

종래에는 이러한 설치 과정 중에서도 안테나 설정 및 튜너 지정을 사용자가 수동으로 입력하여야 했는데, 일반 사용자는 튜너에 대한 입력 조건을 이해하기 어
려우므로 보통 설치 기사 또는 설치 전문가에게 디지털 방송 수신기 설치를 의뢰하고 있는 설정이다. 이러한 경우 추가 비용 및 시간이 소요되게 되고, 디지털 방송 수신기 구입시뿐만 아니라 새로운 채널을 추가할 때마다 이러한 설치 과정을 반복하여야 하는 불편함이 있었다.

【발명이 이루고자 하는 기술적 과제】

본 발명은 상기한 문제점을 해결하기 위해 안출된 것으로, 별도의 사용자 입력 없이도 자동으로 안테나 설정 및 튜너 지정을 수행할 수 있는 디지털 방송 수신기 및 원터치 채널 설정 방법을 제공하기 위한 것이다.

본 발명의 다른 목적들은 이하에 서술되는 바람직한 설치예를 통하여 보다 명확해질 것이다.

【발명의 구성】

상술한 목적을 달성하기 위한 본 발명의 일 측면에 따르면, 본 발명은 디지털 방송 수신기가 채널을 설정하는 방법에 있어서, (a) 채널 설정 요소들의 조합에 의한 가용 채널 설정 값 중 선택된 어느 하나의 가용 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 가용 채널 설정 값에 상응하는 튜너를 튜닝시키는 단계; 및 (b) 튜닝 결과에 따라 가용 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하는 단계를 포함하는 원터치 채널 설정 방법에 관한 것이다.
여기서, 단계 (a)는 (a1) 채널 설정 요소들의 조합에 의한 가용 채널 설정 값을 산출하는 단계; (a2) 가용 채널 설정 값 중 어느 하나의 적용 채널 설정 값을 선택하는 단계; 및 (a3) 선택된 적용 채널 설정 값에 상응하는 위성의 트랜스폰더 목록을 참조하여 적용 채널 설정 값에 상응하는 튜너를 투닝시키는 단계를 포함한다.

또한, 단계 (b)는 튜닝이 성공한 경우 트랜스폰더 목록 중 튜닝 된 트랜스폰더의 신호가 미리 저장된 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부를 판단하는 단계; 및 확인 결과 일치하는 경우에만, 적용 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하는 단계를 포함하되, 일치하지 않는 경우에는, 적용 채널 설정 값을 제외하고 단계 (a)로 진행한다.

또한, 단계 (b)는 튜닝이 성공하지 못한 경우, 적용 채널 설정 값을 제외하고 단계 (a)로 진행한다.

여기서, 튜닝된 트랜스폰더의 신호가 미리 저장된 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부의 판단은, 실제 신호와 저장된 트랜스폰더 신호 정보의 PSI/SI 데이터를 비교함으로써 수행된다.

또한, 트랜스폰더 목록 및 트랜스폰더의 신호의 PSI/SI 데이터는 디지털 방송 수신기에 미리 저장되어 있다.

또한, 가용 채널 설정 값은 위성 정보, LNB 정보 및 디지털 방송 수신기에 구비된 튜너 정보를 포함하는 채널 설정 값의 구성 요소에 상응한다. 여기서, 위성
정보는 디지털 방송 수신기가 지원하는 위성 명일 수 있고, LNB 정보는 LNB 주파수 값, LNB 전압 값일 수 있으며, 튀너 정보는 디지털 방송 수신기가 구비한 튀너 개수일 수 있다.

또한, 가용 채널 설정 값의 구성 요소로 다이렉트 스위치 입력 값, 22 KHz 톤 사용 여부가 더 포함될 수 있다.

여기서, 단계 (a)는 가용 채널 설정 값이 생성될 수 있는 모든 조합의 개수만큼 반복한다. 모든 조합의 개수는 예컨대, 채널 설정 값의 구성 요소인 위성 정보 수, LNB 정보 수, 다이렉트 입력 값의 수, 22 KHz 톤 사용 여부에 대한 경우의 수 및 튀너 개수의 곱으로 산출될 수 있다. 이때, 어느 하나의 안테나 및 튀너가 설정된 경우, 설정된 가용 채널 설정 값과 동일한 튀너 정보 및 다이렉트 스위치 입력 값 을 가지는 다른 채널 설정 값은 튀닝의 대상에서 제외시키고 단계 (a)를 반복할 수도 있다.

또한, 디지털 방송 수신기가 복수의 튀너를 구비한 경우, 각각의 튀너는 단계 (a)에서 서로 다른 적응 채널 설정 값을 이용하여 동시에 튀닝될 수 있다.

본 발명의 다른 측면에 따르면, 본 발명은 하나 이상의 튀너를 구비하고, 안테나로부터 입력되는 신호를 튀닝하는 튀너부, 채널 설정을 위한 요소들을 이용하여 조합 가능한 가용 채널 설정 값 중 어느 하나의 적응 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 적응 채널 설정 값에 상응하는 튀너를 튀닝시키고, 튀닝 결과에 따라 적응 채널 설정 값에 상응하도록 안테나 및 튀너를 설정하는 제어부, 및 튀너에 의해 튀닝된 트랜스폰더의 신호를 가공하여 채널 정보로 저장하는
채널 정보 저장부를 포함하는 디지털 방송 수신기에 관한 것이다.

여기서, 채널 구성 요소들의 조합에 의한 가용 채널 설정 값을 산출하고, 가용 채널 설정 값 중 어느 하나의 적응 채널 설정 값을 선택하며, 선택된 적응 채널 설정 값에 상응하는 위성의 트랜스폰더 목록을 참조하여 적응 채널 설정 값에 상응하는 튜너를 튜닝시키고, 튜닝 결과에 따라 적응 채널 설정 값에 상응하도록 안테나 및 튜너를 설정한다.

또한, 채널 구성 요소의 성공한 경우, 트랜스포너 목록 중 튜닝 된 트랜스포너 더의 신호가 미리 저장된 위성에 상응하는 트랜스포너의 신호 정보와 일치하는지 여부를 판단하고, 확인 결과 일치하는 경우에만 적응 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하고, 일치하지 않는 경우에는 적응 채널 설정 값을 제외하고 다른 가용 채널 설정 값을 이용하여 채널 설정 과정을 반복하며, 튜닝이 성공하지 못한 경우, 적응 채널 설정 값을 제외하고 다른 가용 채널 설정 값을 이용하여 채널 설정 과정을 반복한다.

여기서, 가용 채널 설정 값의 위성 정보, LNB 정보 및 디지털 방송 수신기에 구비된 튜너 정보를 포함하는 채널 설정 값의 구성 요소에 상응한다. 여기서, 위성 정보는 디지털 방송 수신기가 지원하는 위성 명일 수 있고, LNB 정보는 LNB 주파수 값, LNB 전압 값일 수 있으며, 튜너 정보는 디지털 방송 수신기가 구비한 튜너 개 수일 수 있다.

또한, 가용 채널 설정 값의 구성 요소로 디지털 스위치 입력 값, 22 KHz 톤 사용 여부가 더 포함될 수 있다.
또한, 채널 설정 과정은 가용 채널 설정 값이 생성될 수 있는 모든 조합의 수만큼 반복되는데, 모든 조합의 개수는 예컨대, 채널 설정 값의 구성 요소인 위성 정보 수, LNB 정보 수, 다이렉트 입력 값의 수, 22 KHz 톤 사용 여부에 대한 경우의 수 및 튜너 개수의 곱으로 산출될 수 있다. 이때, 어느 하나의 안테나 및 튜너가 설정된 경우, 설정된 가용 채널 설정 값과 동일한 튜너 정보 및 다이렉트 스위치 입력 값을 가지는 다른 채널 설정 값을 튜닝의 대상에서 제외시키고 반복될 수도 있다.

여기서, 튜닝 된 트랜스폰더의 신호가 미리 저장된 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부의 판단은, 실제 신호와 저장된 트랜스폰더 신호 정보의 PSI/SI 데이터를 비교함으로써 수행되고, 디지털 방송 수신기는 트랜스폰더 목록 및 트랜스폰더의 신호의 PSI/SI 데이터를 저장하는 트랜스폰더 정보 저장부를 더 포함할 수 있다.

또한, 디지털 방송 수신기가 복수의 튜너를 구비한 경우, 각각의 튜너가 서로 다른 적응 채널 설정 값을 이용하여 동시에 튜닝될 수 있다.

본 발명은 다양한 변경을 가할 수 있고 여러 가지 실시예를 가질 수 있는 바, 특정 실시예들을 도면에 예시하고 상세한 설명에 상세하게 설명하고자 한다. 그러나, 이는 본 발명을 특정한 실시 형태에 대해 한정하려는 것이 아니며, 본 발명의 사상 및 기술 범위에 포함되는 모든 변경, 균등을 내지 대체물을 포함하는 것으로 이해되어야 한다.
제1, 제2 등과 같이 서수를 포함하는 용어는 다양한 구성 요소들을 설명하는데 사용될 수 있지만, 상기 구성 요소들은 상기 용어들에 의해 한정되지는 않는다는. 상기 용어들은 하나의 구성 요소로 다른 구성 요소로부터 구별하는 목적으로만 사용된다. 예를 들어, 본 발명의 권리 범위를 벗어나지 않으면서 제1 구성 요소는 제2 구성 요소로 명명될 수 있고, 유사하게 제2 구성 요소로 제1 구성 요소로 명명될 수 있다. 빛/또는 이라는 용어는 복수의 관련된 기재된 항목들의 조합 또는 복수의 관련된 기재된 항목들 중의 어느 항목을 포함한다.

어떤 구성 요소가 다른 구성 요소에 "연결되어" 있다거나 "접속되어" 있다고 연결된 때에는, 그 다른 구성 요소에 직접적으로 연결되어 있거나 또는 접속되어 있을 수도 있지만, 중간에 다른 구성 요소가 존재할 수도 있다고 이해되어야 할 것이다. 반면에, 어떤 구성 요소가 다른 구성 요소에 "직접 연결되어" 있다거나 "직접 접속되어" 있다고 연결된 때에는, 중간에 다른 구성 요소가 존재하지 않는 것으로 이해되어야 할 것이다.

본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다. 단수의 표현은 문맥상 명백하게 다르게 뜻하지 않는 한, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가지다" 등의 용어는 명세서상에 기재된 특징, 숫자, 단계, 동작, 구성 요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이지, 하나 또는 그 이상의 다른 특징들이나 숫자, 단계, 동작, 구성 요소, 부품 또는 이들을 조합한 것들의 존재 또는 부가 가능성을 미리 배제하지 않는 것으로 이해되어야 한다.
다른게 정의되지 않는 한, 기술적이거나 구과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미가 있다. 일반적으로 사용되는 사전에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥상 가지는 의미와 일치하는 의미가 있는 것으로 해석되어야 하며, 본 출원에서 명백하게 정의하지 않는 한, 이상적이거나 파도하게 형식적인 의미로 해석되지 않는다.

이하, 참부한 도면들을 참조하여 본 발명에 따른 바람직한 실시예를 상세히 설명하기로 하며, 참부 도면을 참조하여 설명함에 있어 도면 부호에 상관없이 동일하거나 대응하는 구성 요소는 동일한 참조번호를 부여하고 이에 대한 중복되는 설명은 생략하기로 한다.

도 2는 본 발명의 일 실시예에 따른 가용 채널 설정 값의 구성 요소를 설명한 표이다.

도 2를 참조하면, 본 발명의 실시예에서 채널 설정 값을 구성하는 요소는 크게 안테나 설정과 튜너 지정 시 필요한 조건으로 분류된다.

본 실시예에 따르면, 안테나 설정을 위한 조건에는 위성 정보, LNB (Low Noise Block down converter: 저잡음 주파수 변환기) 정보 등이 있다. 전술한 바와 같이 위성 정보에는 위성 명이 포함되고, LNB 정보에는 LNB 주파수 값, LNB 전압 값 등이 포함된다.
여기서, LNB는 위성에서 송출하는 4 ~ 12 GHz대의 고 주파수를 1 GHz대의 중간 주파수로 변경하는 역할을 하는 것으로, 안테나의 중앙에 위치한다.

또한, 안테나 설정 조건으로서 22 KHz 톤(Tone)의 사용 여부(on/off) 및 다이렉스 스위치(Diseqc Switch) 입력 값 등이 포함될 수 있다. 물론, 본 실시에는 상기한 요소들에 한정되는 것은 아니며, 추후 추가되거나 생략되는 요소들을 반영하는 것은 당업자에게 당연하다.

여기서, 다이렉스 스위치는 여러 개의 안테나가 있을 때 안테나를 자동으로 선택해주는 기기이다. 한 개의 다이렉스 스위치는 일반적으로 2포트 또는 4포트로 구성되어 위성 안테나를 2개 또는 4개까지 수용할 수 있다. 여기서, 다이렉스 스위치 입력 값이란 각 포트를 지정하는 값에 해당한다.

또한, 22 KHz 톤은 사용(on) 또는 불사용(off) 모드 중 어느 하나로 선택된다.

한편, 튜너 지정이란 복수 개의 튜너가 있는 경우에 어느 튜너에 탑색할 안테나가 연결되어 있는지 지정해 주는 것을 의미한다.

본 출원에서는 전술한 위성 정보, LNB 정보, 22 KHz 톤(Tone)의 사용 여부, 다이렉스 스위치 입력 값 및 튜너 등 채널 설정 구성 요소들의 각 조합을 "채널 설정 값"이라 하기로 한다. 예를 들어, koreasat이라는 위성, 10600 MHz의 LNB 주파수, A 포트를 지정한 다이렉스 스위치 입력 값, 22 KHz 톤을 사용하지 않는 조건으로 안테나를 설정할 수 있고, 이렇게 설정된 안테나가 제1 튜너에 연결된 것으로 설정하
여 하나의 채널 설정 값을 산출할 수 있다.

도 3내지 도 5는 디지털 방송 수신기에 연결된 위성 내의 메뉴 목록을 도시한 도면이다.

도 3 내지 도 5를 참조하면, 각 위성은 하나 이상의 트랜스폰더(transponder : TP)를 가진다. 트랜스폰더는 지상에 위치한 방송국에서 송출한 송신 전파를 수신한 후에 이를 위성 내부에서 증폭하여 지상으로 재송신하는 위성 중계기로서, 각 트랜스폰더는 복수 개의 채널을 중계한다. 트랜스폰더가 중계하는 복수 개의 채널 군은 트랜스폰더 정보라는 동일한 신호 특성을 가지는데 비하여, 동일한 위성 내라도 트랜스폰더의 종류가 다르다면 트랜스폰더 정보 또한 상이하게 된다.

여기서, 트랜스폰더 정보란 트랜스폰더의 신호 특성에 관한 것으로서, 주파수, 심볼율 (symbol rate), FEC (forward Error Correction, 순방향 오류 정정) 값 및 편파 (polarization) 등 중 하나 이상을 포함한다.

디지털 위성 방송 신호를 중계하는 각 위성에는 대체로 수십 개의 트랜스폰더가 설치되어 있는데, 이들을 트랜스폰더 목록 (transponder list)이라 칭한다. 또한, 각 트랜스폰더에는 개수의 제한은 없으나, 전송되는 신호의 데이터 전송률이 허용하는 범위 내에서 대체로 수개 내지 수십 개의 채널이 설정되어 있다. 위와 같이 설정된 복수 개의 채널을 통해 다양한 디지털 위성 방송 신호가 디지털 방송 수신기로 수신된다.
디지털 방송 수신기에서 위성 방송 정보는 위성 별로 관리 운용되는데 예를 들어, 도 3에 도시된 바와 같이 복수 개의 위성 중 위성 1에 연계되는 하위 메뉴는 위성 1에 속하는 채널 (CH 11 - CH 11L)로 구성되거나, 도 4에 도시된 바와 같이 위성 1에 속하는 트랜스폰더 (TP 1 - TP M)로 구성된다. 또한, TP 1의 하위 메뉴는 도 5에 도시된 바와 같이 TP 1에 속하는 채널 (CH 111 - CH 111L)로 구성될 수 있다.

도 6은 본 발명의 일 실시예에 따른 디지털 방송 수신기에서의 원터치 채널 설정 과정을 도시한 흐름도이다.

도 6을 참조하면, 원터치 채널 설정 기능 실행 명령에 따른 소정의 키가 입력되면, 디지털 방송 수신기는 단계 210에서 채널 설정을 위한 각 요소들을 이용하여 조합 가능한 채널 설정 값을 산출한다.

여기서, 채널 설정 값은 각 조건들을 조합하기에 따라 다양하게 설정될 수 있다. 예컨대, 디지털 방송 수신기가 지원하는 최대의 위성 개수가 K개이고, LNB 주파수의 최대 L개이며, 다이렉 스위치 입력 값의 최대 개수 M개, 22 KHZ 트의 사용 여부에 대한 경우의 수 2개 (은 또는 오프), 디지털 방송 수신기에 구비된 최대 튜너의 수 N개가 있다고 가정한다. 이때, 조합할 수 있는 채널 설정 값의 최대 개수는 \( K \times L \times M \times 2 \times N \) 개가 될 수 있다.

본 명세서에서는 이와 같이 조합 가능한 채널 설정 값을 "가용 채널 설정 값"이라고 칭하기로 한다. 즉, 가용 채널 설정 값은 상기한 바와 같이 \( K \times L \times M \times 2 \times N \) 개가 될 수 있다.
2 x N 개일 수 있다.

단계 220에서 디지털 방송 수신기는 산출된 가용 채널 설정 값 중 어느 하나의 적용 채널 설정 값을 선택한다. 여기서, 본 설정에 따른 "적용 채널 설정 값"이란 설명의 편의를 위한 것으로, 튜닝하기 위해 가용 채널 설정 값 중 선택된 어느 하나의 채널 설정 값을 의미한다.

한편, 상기한 단계 210에서 채널 설정을 위한 각 요소들을 이용하여 조합 가능한 모든 가용 채널 설정 값이 산출된 후, 단계 220이 수행될 수 있다. 물론, 하나의 가용 채널 설정 값만을 산출하여 이를 적용 채널 설정 값으로 이용할 수도 있다.

단계 230에서 디지털 방송 수신기는 선택된 적용 채널 설정 값에 상응하는 위성의 트랜스폰더 목록을 참조하여, 적용 채널 설정 값에 상응하는 튜너를 튜닝시킨다. 여기서, 채널 설정 값에는 하나의 위성 및 하나의 튜너가 지정될 수 있다.

전송된 바와 같이 트랜스폰더 목록이란 각 트랜스폰더들의 집합이며, 트랜스폰더 별로 상이한 트랜스폰더 정보를 갖는다. 따라서, 디지털 방송 수신기에 구비된 튜너는 안테나 설정시 지정된 위성에 상응하는 트랜스폰더 목록의 각 트랜스폰더 정보를 순차적으로 엽력받아 튜닝시킨다.

이후, 단계 240에서 디지털 방송 수신기는 트랜스폰더 목록의 각 트랜스폰더 정보에 의하여 튜닝이 성공하였는지를 판단한다. 이는, 디지털 방송 수신기가 적용 채널 설정 값에 상응하는 위성에 상응하는 트랜스폰더 목록의 모든 트랜스폰더 정보에 대하여 튜닝을 시도한 후 튜닝이 성공한 트랜스폰더 정보를 산출하고, 성공한
트랜스폰더 정보들은 단계 250으로 진행시키는 방식으로 수행될 수 있다.

또는, 디지털 방송 수신기가 각 트랜스폰더 정보마다 순차적으로 튜닝 성공 여부를 판단한 결과 어느 한 트랜스폰더 정보로 인하여 튜닝이 성공한다면, 바로 단계 250으로 진행시키는 방식으로 수행될 수도 있다. 도 6에 구체적으로 도시되어 있는지 않지만, 디지털 방송 수신기는 만일 단계 250에서 판단 결과 현재의 튜닝된 트랜스폰더 정보가 적용 채널 설정 값을 상응하는 위성의 신호가 아닌 것으로 판명 되면, 적용 채널 설정 값에 상응하는 위성에 상응하는 트랜스폰더 목록의 나머지 트랜스폰더 정보를 이용하여 단계 240을 반복할 수 있다.

한편, 디지털 방송 수신기는 단계 240에서의 판단 결과 안테나 설정 시 지정 된 위치에 상응하는 트랜스폰더 목록의 모든 트랜스폰더 정보에 대하여 튜닝이 성공하지 못하였다면, 우선 단계 280에서 디지털 방송 수신기는 현재의 적용 채널 설정 값이 가용 채널 설정 값 중 마지막까지 여부를 판단한다.

마지막인 경우라면 채널 설정 과정을 종료할 것이지만, 마지막이 아니라면 단계 290에서 디지털 방송 수신기는 적용 채널 설정 값을 제외하고 나머지 가용 채널 설정 값 중 다른 하나의 적용 채널 설정 값을 선택하여 채널 설정 과정을 반복 한다.

디지털 방송 수신기는 단계 240에서의 판단 결과 어느 한 트랜스폰더 정보에 대하여 튜닝이 성공하였다면, 단계 250에서는 적용 채널 설정 값에 따라 튜닝된 신호가 실제 해당 트랜스폰더의 신호 정보와 일치하는지 여부를 확인한다. 이때, 트랜스폰더의 신호 정보는 디지털 방송 수신기에 미리 저장되어 있다고 가정한다.
이는 튜닝된 결과에 따른 출력 신호가 실제 트랜스폰더의 트랜스포트 스트럼으로부터 ISO/IEC 13181-1에 정의된 PSI 데이터 또는 ETSI EN 300 468에 정의된 SI 데이터와 동일한 신호인지를 판별함으로써 수행될 수 있다.

여기서, PSI(program specific information)는 MPEG-2 트랜스포트 스트럼을 사용해서 전송되는 프로그램 제어용 표에 관한 프로그램 지정 정보로서 ISO/IEC 13818-1에 정의되어 있고, SI는 ETSI EN 300 468에 정의되어 있다.

한편, 튜닝이 성공하였음에도 불구하고 튜닝된 신호가 실제 적용 채널 설정 값에 상응하는 위성의 트랜스폰더의 신호인지를 확인하는 이유는 위성이 가지는 트랜스폰더의 개수가 많아지면, 튜너의 일반적인 입력 주파수 범위인 950-2150 MHz 내에서 위성 간 중복되는 튜닝 정보(주파수, 심볼율, FEC, 편파 등)를 가지는 경우가 발생될 수 있기 때문이다. 즉, 실제로는 적용 채널 설정 값에 상응하는 위성의 트랜스폰더의 신호가 아님에도 불구하고, 예외적으로 튜닝이 성공되어 안테나 설정 및 튜너 지정이 잘못 이루어지는 경우를 방지하기 위함이다.

디지털 방송 수신기는 단계 260에서 확인 결과 튜닝된 트랜스폰더의 신호와 저장된 트랜스폰더 신호 정보가 일치한다고 판단되면, 단계 270에서 적용 채널 설정 값에 따라 안테나 설정 및 튜너를 지정한다. 즉, 해당 채널 설정 값에 따른 하나의 채널 설정이 완료되는 것이다. 따라서 본 실시예에 따르면 사용자의 별도 입력 없이도 채널 설정을 수행할 수 있다.

디지털 방송 수신기는 단계 260에서 튜닝된 트랜스폰더의 신호와 저장된 트랜스폰더 신호 정보가 실제로는 일치하지 않는다면, 도 6에 도시된 바와 같이 단계
280으로 진행한다.

단계 280에서 디지털 방송 수신기는 T개의 모든 가용 채널 설정 값에 대하여 채널 설정 과정을 시도한 것인지 확인한다. 만일 튜닝 시도하지 않은 가용 채널 설정 값이 남아 있다면 디지털 방송 수신기는 단계 290에서 단계 220으로 되돌아가고, 마지막 가용 채널 설정 값까지 모두 튜닝 시도한 경우에는 원터치 채널 설정 과정을 종료한다.

이후, 수신된 위성 신호에 상응하는 채널을 검색하고 저장하는 채널 탐색 과정이 끝나는 것은 당업자에게 자명하다.

한편, 두 개 이상의 튜너를 가진 제품에서는 복수의 각 튜너를 동시에 서로 다른 적용 채널 설정 값을 이용하여 튜닝시켜 채널을 설정하는 과정을 수행할 수 있다. 이러한 경우, 튜너별로 순차적으로 채널 설정 과정을 수행하는 것보다 전체적인 채널 설정 시간을 줄일 수 있는 이점이 있다.

문론, 각 복수의 튜너에서 동시에 튜닝을 시도하는 경우, 각 튜너가 동일한 적용 채널 설정 값을 이용하지 않도록 제어해야 함은 당연하며, 또한 각 튜너에서 사용된 적용 채널 설정 값은 다른 튜너에서 이용하지 못하도록 제외됨은 당연하다.

위와 같이, 본 실시예에 따르면 사용자는 한 번의 키 조작만으로 디지털 방송 수신기의 안테나 설정 및 튜너 지정이 완료할 수 있다. 이를 본 발명에서는 원터치 방식이라고 표현한다. 즉, 사용자는 한 번의 명령을 입력함으로써 채널 설정 과정을 완료할 수 있게 되고, 이러한 원터치 방식의 채널 설정 방법은 사용자 측에

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의성을 중대시킨다.

도 7은 본 발명의 다른 실시예에 따른 디지털 방송 수신기에서의 원터치 채널 설정 과정을 도시한 화물도이다.

도 7을 참조하면, 단계 310 내지 단계 390은 도 6의 단계 210 내지 290에 상응하므로 구체적인 설명은 생략 키로 한다. 다만, 도 6의 단계 280은 도 7의 단계 380 및 385에 대응된다고 볼 것이다.

도 6에 따른 실시예와는 달리, 본 실시예에서 디지털 방송 수신기는 하나의 작용 채널 설정 값에 따라 안테나 및 튜너가 설정되며, 나머지 가용 채널 설정 값을 중 해당 작용 채널 설정 값에서 동일한 튜너 정보 및 다이렉트 스위치 입력 값을 갖는 채널 설정 값을 작용 채널 설정 값의 대상(즉. 튜닝의 대상)에서 제외시킨다.

 이를 구체적으로 설명하면, 안테나 및 튜너를 설정 한 작용 채널 설정 값이 마지막 채널 설정 값이 아닌 경우, 단계 400에서 디지털 방송 수신기는 설정된 채널 설정 값의 튜너 정보 및 다이렉트 스위치 입력 값이 동일한 다른 가용 채널 설정 값을 모두 제외하고, 나머지 가용 채널 설정 값 중에서 어느 하나를 작용 채널 설정 값으로 선택하여 채널 설정 과정을 진행한다. 이에 반해, 마지막 채널 설정 값이라면 원터치 채널 설정 과정은 종료된다.

따라서, 본 실시예는 도 6의 실시예에 비하여 튜닝 시도하는 가용 채널 설정 값의 개수(즉, 작용 채널 설정 값의 개수)가 상대적으로 적을 수 있다.
이는 하나의 다이렉 스위치는 트너 별로 하나의 안테나 설정만 가진다는 원리에 이용한 것이다. 즉, 본 실시예에서는 이미 찾아 다이렉 스위치 입력 값과 같은 트너를 가진 다른 모든 위치에 대해서는 트닝 시도를 하지 않는다.

한편, 본 실시예에서도 두 개 이상의 트너를 가진 제품에서는 복수의 각 트너를 동시에 서로 다른 가용 채널 설정 값을 이용하여 트닝시켜 채널을 설정하는 과정을 수행할 수 있다.

도 8은 본 발명의 일 실험에 따른 디지털 방송 수신기의 블록 구성도를 도시한 것이다.

도 8에 도시된 바와 같이, 본 실시예에 따른 디지털 방송 수신기는 트너부(10), 제어부(20), 트랜스폰더 정보 저장부(30) 및 채널 정보 저장부(40)를 포함한다.

트너부(10)는 안테나로부터 입력되는 고주파 신호를 LNB에 의하여 변환된 신호로 받아, 영상 신호와 음성 신호 등으로 추출하여 추출된 신호를 텔레비전 등으로 송출하는 역할을 수행한다.

제어부(20)는 사용자로부터 입력된 채널 설정 요구 또는 설정된 주기에 구동하여 채널 설정을 위한 요소들을 이용하여 조합 가능한 가용 채널 설정 값 중 어느 하나의 적용 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 상기 적용 채널 설정 값에 상응하는 트너를 트닝시키는 역할을 수행한다.
또한, 제어부(20)는 각 튜너에서 튜닝이 성공한 경우 트랜스폰더 목록 중 튜닝된 트랜스폰더의 신호가 미리 저장된 상기 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지를 확인하고, 확인 결과 일치하는 경우 상기 선택된 적용 채널 설정 값을 상응하도록 안테나 및 튜너를 설정하는 등 디지털 방송 수신기의 전반적인 동작을 제어하는 역할을 수행한다.

채널 정보 저장부(40)는 튜너에 의해 튜닝 성공된 트랜스폰더 신호의 PSI/SI 를 읽어와 가공하여 채널 정보로 구성하여 저장한다. 예를 들어, 채널 정보 저장부 (40)는 램, 플래쉬 메모리, 하드디스크 등의 메모리 장치로 구현될 수 있다.


【발명의 효과】

상술한 바와 같이 본 발명은 안테나 및 튜너 지정 과정을 자동화하여 채널을 탐색할 수 있다. 즉, 사용자는 한 번의 명령을 입력함으로써 채널 설정 과정을 완료할 수 있게 되고, 이러한 원터치 방식의 채널 설정 방법은 사용자 편의성을 증대시킨다.
또한, 본 발명은 자동으로 안테나 및 튜너 지정 과정이 수행되어 사용자 입장에서는 디지털 방송 수신기를 처음 설치하거나 채널을 변경하는 경우 소요되는 노력과 비용을 절감할 수 있고, 나아가 원하는 방송 채널을 보다 신속하고 효율적으로 선택 수신할 수 있다.

상기에서는 본 발명의 바람직한 실시예를 참조하여 설명하였지만, 해당 기술 분야에서 통상의 지식을 가진 자라면 하기의 특허청구범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는 범위 내에서 본 발명을 다양하게 수정 및 변경시킬 수 있음을 이해할 수 있을 것이다.
【특허청구범위】

【청구항 1】

디지털 방송 수신기가 채널을 설정하는 방법에 있어서,

(a) 채널 설정 요소들의 조합에 의한 가용 채널 설정 값 중 선택된 어느 하나의 적응 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 상기 적응 채널 설정 값에 상응하는 튜너를 튜닝시키는 단계; 및

(b) 상기 튜닝 결과에 따라 상기 적응 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하는 단계를 포함하는 원터치 채널 설정 방법.

【청구항 2】

제1항에 있어서, 상기 단계 (a)는,

(a1) 채널 설정 요소들의 조합에 의한 가용 채널 설정 값을 산출하는 단계;

(a2) 상기 가용 채널 설정 값 중 어느 하나의 적응 채널 설정 값을 선택하는 단계; 및

(a3) 상기 선택된 적응 채널 설정 값에 상응하는 위성의 트랜스폰더 목록을 참조하여 상기 적응 채널 설정 값에 상응하는 튜너를 튜닝시키는 단계를 포함하는 것을 특정으로 하는 원터치 채널 설정 방법.
【청구항 3】

제1항에 있어서, 상기 단계(b)는,

상기 튜닝이 성공한 경우 상기 트랜스폰더 목록 중 튜닝 된 트랜스폰더의 신호가 미리 저장된 상기 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부를 판단하는 단계; 및

상기 확인 결과 일치하는 경우에만, 상기 적용 채널 설정 값에 상응하도록 안테나 및 트너를 설정하는 단계를 포함하되,

일치하지 않는 경우에는, 상기 적용 채널 설정 값을 제외하고 상기 단계 (a)로 진행하는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 4】

제3항에 있어서, 상기 단계(b)는,

상기 튜닝이 성공하지 못한 경우, 상기 적용 채널 설정 값을 제외하고 상기 단계 (a)로 진행하는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 5】

제3항에 있어서,

상기 튜닝된 트랜스폰더의 신호가 미리 저장된 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부의 판단은, 트랜스폰더의 신호와 저장된 트랜스폰
더 신호 정보의 PSI/SI 데이터를 비교함으로써 수행되는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 6】

제5항에 있어서,

상기 트랜스폰더 목록 및 상기 트랜스폰더의 신호의 PSI/SI 데이터는 상기 디지털 방송 수신기에 미리 저장되어 있는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 7】

제1항에 있어서,

상기 가용 채널 설정 값은

위성 정보, LNB 정보 및 튜너 정보를 포함하는 채널 설정 값의 구성 요소에 상응하도록 산출되는 것을 특징으로 하는 디지털 방송 수신기에서의 원터치 채널 설정 방법.

【청구항 8】

제7항에 있어서,

상기 채널 설정 값의 구성 요소는
다이석 스위치 입력 값, 22 KHz 톤 사용 여부를 더 포함하는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 9】

제7항에 있어서,

상기 단계 (a)는 상기 가용 채널 설정 값이 생성될 수 있는 모든 조합의 개수만큼 반복되는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 10】

제9항에 있어서,

상기 모든 조합의 개수는,

상기 채널 설정 값의 구성 요소인 위성 정보 수, LNB 정보 수, 다이석 입력 값의 수, 22 KHz 톤 사용 여부에 대한 경우의 수 및 튜너 개수의 곱으로 산출되는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 11】

제10항에 있어서,

어느 하나의 안테나 및 튜너가 설정된 경우, 설정된 가용 채널 설정 값과 동일한 튜너 정보 및 다이석 스위치 입력 값을 가지는 다른 채널 설정 값은 상기 튜
당의 대상에서 제외시키는 단계를 더 포함하는 원터치 채널 설정 방법.

【청구항 12】

제1항에 있어서,

상기 디지털 방송 수신기가 복수의 튜너를 구비한 경우, 각각의 튜너는 상기 단계 (a)에서 서로 다른 적응 채널 설정 값을 이용하여 동시에 튜닝되는 것을 특징으로 하는 원터치 채널 설정 방법.

【청구항 13】

디지털 방송 수신기에 있어서,

하나 이상의 튜너를 구비하고, 안테나로부터 입력되는 신호를 튜닝하는 튜너 부;

채널 설정 요소들의 조합에 의한 가용 채널 설정 값 중 어느 하나의 적응 채널 설정 값에 상응하는 트랜스폰더 목록을 참조하여 상기 적응 채널 설정 값에 상응하는 튜너를 튜닝시키고, 상기 튜닝 결과에 따라 상기 적응 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하는 제어부; 및

상기 튜너에 의해 튜닝된 트랜스폰더의 신호를 가공하여 채널 정보로 저장하기 위한 채널 정보 저장부를 포함하는 디지털 방송 수신기.
【청구항 14】
제13항에 있어서, 상기 제어부는
채널 설정 요소들의 조합에 의한 가용 채널 설정 값을 산출하고, 상기 가용 채널 설정 값 중 어느 하나의 적용 채널 설정 값을 선택하며, 상기 선택된 적용 채널 설정 값에 상응하는 위성의 트랜스폰더 목록을 참조하여 상기 적용 채널 설정 값에 상응하는 튜너를 튜닝시키고, 상기 튜닝 결과에 따라 상기 적용 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 15】
제14항에 있어서, 상기 제어부는
상기 튜닝이 성공한 경우, 상기 트랜스폰더 목록 중 튜닝 된 트랜스폰더의 신호가 미리 저장된 상기 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부를 판단하고,
확인 결과 일치하는 경우에만 상기 적용 채널 설정 값에 상응하도록 안테나 및 튜너를 설정하고, 일치하지 않는 경우에는 상기 적용 채널 설정 값을 제외하고 다른 가용 채널 설정 값을 이용하여 채널 설정 과정을 반복하며,
상기 튜닝이 성공하지 못한 경우, 상기 적용 채널 설정 값을 제외하고 다른 가용 채널 설정 값을 이용하여 채널 설정 과정을 반복하는 것을 특징으로 하는 디지털 방송 수신기.
지털 방송 수신기.

【청구항 16】

제13항에 있어서,
장기 가용 채널 설정 값은
위성 정보, LNB 정보 및 튜너 정보를 포함하는 채널 설정 값의 구성 요소에
상응하도록 산출되는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 17】

제16항에 있어서,
장기 채널 설정 값의 구성 요소는
다이렉 스위치 입력 값, 22 KHz 톤 사용 여부를 더 포함하는 것을 특징으로
하는 디지털 방송 수신기.

【청구항 18】

제15항에 있어서,
장기 채널 설정 과정은 장기 가용 채널 설정 값이 생성될 수 있는 모든 조합
의 수만큼 반복되는 것을 특징으로 하는 디지털 방송 수신기.
【청구항 19】

제18항에 있어서,

상기 모두 조합의 개수는,

상기 채널 설정 값의 구성 요소인 위성 정보 수, LNB 정보 수, 다이렉트 입력 값의 종류, 22 KHz 튼 사용 여부에 대한 경우의 수 및 튜너 개수의 곱으로 산출되는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 20】

제19항에 있어서,

어느 하나의 안테나 및 튜너가 설정된 경우, 설정된 가용 채널 설정 값과 동일한 튜너 정보 및 다이렉트 스위치 입력 값을 가지는 다른 채널 설정 값은 상기 튜너의 대상에서 제외시키는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 21】

제15항에 있어서,

상기 튜닝된 트랜스폰더의 신호가 미리 저장된 위성에 상응하는 트랜스폰더의 신호 정보와 일치하는지 여부의 판단은, 트랜스폰더의 신호와 저장된 트랜스폰더 신호 정보의 PSI/SI 데이터를 비교함으로써 수행되는 것을 특징으로 하는 디지털 방송 수신기.
【청구항 22】

제21항에 있어서,

상기 디지털 방송 수신기는

상기 트랜스폰더 목록 및 상기 트랜스폰더의 신호의 PSI/SI 데이터를 저장하는 트랜스폰더 정보 저장부를 더 포함하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 23】

제13항에 있어서,

상기 디지털 방송 수신기가 복수의 튜너를 구비한 경우, 각각의 튜너가 서로 다른 작용 채널 설정 값을 이용하여 동시에 튜닝되는 것을 특징으로 하는 디지털 방송 수신기.
【도면】

【도 1】

시작

UI 화면표시 110

입력된 값에 상응하도록 안테나 세팅 120

입력된 값에 상응하도록 튜너 지정 130

채널 탐색 140

성공? 150

아니오

예

종료

【도 2】

채널 설정 값의 구성 요소
(1) 위성명 → {Hotbird, Astra, Uilesat, ...}
(2) LNB 주파수 → {Universal, 10600, ...}
(3) 다이렉 스위치 입력값 → {A,B,C,D, ...}
(4) 22Khz 톤 → {On, Off}
(5) Tuner → {1,2,3, ...}
【도 3】

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[도 6]

시작

가용 채널 설정 값 산출 210

하나의 적용 채널 설정 값 선택 220

적용 채널 설정 값 및 그에 상응하는 TP 목록을 참조하여 튜너를 순차적으로 튜닝 230

240 아닙니다

튜닝 성공? 

예

튜닝된 TP 신호와 적용 채널 설정 값에 상응하는 TP 신호의 일치 여부 확인 250

260 아닙니다

TP 신호 일치? 

예

안테나 및 튜너 설정 270

아니오

마지막 가용 채널 설정 값 인가? 

예

종료

39-37
【도 8】
Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections.

Applicant(s)

Ho Yi, Residence Not Provided;
Seung-Kwan Ha, Residence Not Provided;
Jun-Hyung Kim, Residence Not Provided;

Power of Attorney: None

Domestic Priority data as claimed by applicant

Foreign Applications

REPUBLIC OF KOREA 10-2006-0121905 12/05/2006

If Required, Foreign Filing License Granted: 10/29/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 11/872,149

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No
DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process simplifies the filing of patent applications on the same invention in member countries, but does not result in a grant of “an international patent” and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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Applicants may wish to consult the USPTO booklet, “General Information Concerning Patents” (specifically, the section entitled “Treaties and Foreign Patents”) for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help “toolkits” giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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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 $310 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:

• Additional claim fees of $150 as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
• 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 notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $1310 for a non-small entity

• $310 Statutory basic filing fee.
• $130 Surcharge.
• The application search fee has not been paid. Applicant must submit $510 to complete the search fee.
• The application examination fee has not been paid. Applicant must submit $210 to complete the examination fee for a non-small entity.
• Total additional claim fee(s) for this application is $150
  • $150 for 3 total claims over 20.

Replies should be mailed to:

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Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sporal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/wjsale/

_______________________________________________________________
Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199
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
401 Dulany Street
Alexandria, VA 22314

Docket No.: EZ-0004

Sir:

Transmitted herewith for filing is the patent application of

INVENTORS: Ho YI; Seung-Kwan HA and Jun-Hyung KIM

FOR: DIGITAL BROADCASTING RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

Enclosed are:

1. ☒ 27 pages of specification, claims, abstract
2. ☐ 8 sheets of FORMAL drawings
3. ☐ ______ pages of newly executed Declaration & Power of Attorney (copy or original) (To Follow)
4. ☒ Priority claimed to Appln. No. 10-2006-0121905 filed on December 5, 2006 in Korea, whose entire disclosure is incorporated herein by reference.
5. ☐ Applicant claims Small Entity Status
6. ☐ Information Disclosure Statement, Form PTO-1449 and ______ references
7. ☐ Assignment papers for HUMAX Co., Ltd. ______ cover sheet, assignment and assignment fee) (To Follow)
8. ☐ Certified copy of Priority Application No. 10-2006-0121905 filed on December 5, 2006 in Korea (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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**CLAIMS AS FILED**

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APPLICATION SIZE FEE ( X 50 = 250.00)

BASIC FILING FEE $310.00

UTILITY SEARCH FEE $510.00

UTILITY EXAMINATION FEE $210.00

TOTAL FILING FEE $1,810.00

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☐ Please charge my Credit Card.

☐ 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,
KED & ASSOCIATES, LLP

Daniel Y[I]. Kim
Registration No. 36,186

Correspondence Address:
P.O. Box 221200
Chantilly, Virginia 20153-1200
703-766-3777 DYK/dak

Date: October 15, 2007

Please direct all correspondence to Customer Number 34610
## Electronic Acknowledgement Receipt

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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.
TITLE

DIGITAL BROADCAST RECEIVER AND ONE-TOUCH CHANNEL SETTING METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of Korean Patent Application No. 10-2006-0121905 filed with the Korean Intellectual Property Office on Dec. 5th, 2006, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

1. Technical Field

The present invention relates to channel setting, more particularly to a digital broadcast receiver and a one-touch channel setting method.

2. Description of the Related Art

In general, a digital broadcasting receiver is equipped with a personal video recording function, for recording and saving a digital broadcast receiver on a recording medium such as a hard disk, and is connected to a digital broadcast antenna and television. The digital broadcast receiver may also use multiple tuners, to allow a user viewing one channel to view another channel using the picture-in-picture (PIP) function or to record another channel.

Also, the digital broadcasting receiver has a channel search function, which is the first function to be activated after the user purchases the digital broadcast receiver, and which is activated periodically during use to re-register channel information if it is changed.
Figure 1 is a flowchart illustrating general procedures of searching channels for a digital broadcast receiver equipped with multiple tuners.

Referring to Figure 1, the digital broadcast receiver first displays a UI screen, in operation 110, for receiving channel setting conditions from the user as input.

In operation 120, the digital broadcast receiver sets the antenna according to one or more inputs made through the UI screen regarding setting conditions for the antenna, such as satellite information (e.g. satellite name, etc.), LNB information (e.g. LNB frequency, voltage, etc.), the use of 22 KHz tone (on/off), and DiSEqC switch value, etc.

After setting the antenna, in operation 130, the digital broadcast receiver has to select which tuner the antenna is connected to, from among multiple tuners, which is referred to as “tuner selection.”

In operation 140, after the tuner selection, the digital broadcast receiver performs a “channel search” using information on the transponder (TP) to be searched.

In operation 150, the digital broadcast receiver determines whether or not the channel search has been performed successfully. If the channel search is not performed, this means that one or more of the antenna setting conditions and the selected tuner have been set incorrectly, so the digital broadcast receiver returns to operation 110 and notifies that the channel search has failed, and displays the UI screen to receive a new command as input.

In the past, the user had to provide input manually in the installing process, for setting the antenna and selecting the tuner, and as it is difficult for a general user to understand the input conditions for the tuner, the user typically had to depend on an installation technician or
installation expert to install the digital broadcast receiver. This incurred extra costs and time consumption, and there was also the inconvenience not only of having to perform the installation procedures at the time of purchase of the digital broadcast receiver but also of having to repeat them every time a new channel was to be added.

SUMMARY

An aspect of the invention is to provide a digital broadcast receiver and one-touch channel setting method which allow automatic antenna setting and tuner selection without additional user input.

One aspect of the invention provides a one-touch channel setting method, by which to set channels in a digital broadcast receiver, which includes: tuning a tuner corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and setting an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result.

Here, the tuning may include producing available channel setting values from combinations of channel setting value factors, choosing an applied channel setting value from the available channel setting values, and tuning a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.
Also, the setting may include determining whether or not the tuned signal of the transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, if the tuning is successful, and setting the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and if there is no match, the method may proceed to the tuning again with the applied channel setting value removed.

In addition, if the tuning is unsuccessful, the method may proceed to the tuning again with the applied channel setting value removed.

Here, the determining of whether or not the tuned signal of the transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite may be performed by comparing the PSI/SI data of the stored transponder signal information and the signal of the transponder.

The PSI/SI data of the stored transponder signal information and the signal of the transponder may be pre-stored in the digital broadcast receiver.

Also, the available channel setting value may be produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information. Here, satellite information may be the names of satellites that the digital broadcast receiver is able to support, LNB information may be LNB frequency values, LNB voltage values, etc., and tuner information may be the number of tuners that the digital broadcast receiver has.

In addition, the channel setting value factors may further include DiSEqC switch value and whether or not 22 KHz tone is used.
Here, the tuning may be repeated for the number of all possible combinations of the available channel setting values. The number of all possible combinations may be calculated, for example, by multiplying the number of satellite information, the number of LNB information, the number of DiSEqC switch values, the number of possible cases on whether or not 22 KHz tone is used, and the number of tuners. Here, if any one combination of antenna and tuner is set, the tuning may be repeated after excluding other channel setting values that have the same tuner information and DiSEqC switch input value as those of the set available channel setting value.

Furthermore, if the digital broadcast receiver has a plurality of tuners, each tuner may be tuned simultaneously in the tuning, using a different applied channel setting value.

Another aspect of the invention relates to a digital broadcast receiver that includes: a tuner unit, which has one or more tuners and which tunes a signal inputted from an antenna; a control unit, which tunes a tuner corresponding to an applied channel setting value chosen from available channel setting values that are made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and which sets an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result; and a channel information storage unit, which processes the signal of a transponder tuned by the tuner and stores it as channel information.

Here, the control unit may produce available channel setting values from combinations of channel setting value factors, choose an applied channel setting value from the available channel setting values, and tune a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.
Also, the control unit may, determine whether or not the tuned signal of the transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, if the tuning is successful; set the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and repeat the channel setting procedure with the applied channel setting value removed, if there is no match; and repeat the channel setting procedure with the applied channel setting value removed, if the tuning is unsuccessful.

Here, the available channel setting value may be produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information. The satellite information may be the names of satellites that the digital broadcast receiver is able to support, LNB information may be LNB frequency values, LNB voltage values, etc., and tuner information may be the number of tuners that the digital broadcast receiver has.

The channel setting value factors may further include DiSEqC switch value and whether or not 22 KHz tone is used.

Also, the channel setting procedure may be repeated for the number of all possible combinations of the available channel setting values, the number of which may be calculated, for example, by multiplying the number of satellite information, the number of LNB information, the number of DiSEqC switch values, the number of possible cases on whether or not 22 KHz tone is used, and the number of tuners. If any one combination of antenna and tuner is set, the tuning may be repeated after excluding other channel setting values that have the same tuner information and DiSEqC switch input value as those of the set available channel setting value.
Determining whether or not the tuned signal of the transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite may be performed by comparing the PSI/SI data of the stored transponder signal information and the signal of the transponder, and the digital broadcast receiver may further include a transponder information storage unit which stores the PSI/SI data of the signal of the transponder and the transponder list.

In addition, if the digital broadcast receiver has a plurality of tuners, each tuner may be tuned simultaneously in the tuning, using a different applied channel setting value.

Additional aspects and advantages of the present invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a flowchart illustrating general procedures of searching channels for a digital broadcast receiver equipped with multiple tuners.

Figure 2 is a chart illustrating the factors of available channel setting values according to an embodiment of the invention.

Figure 3, Figure 4, and Figure 5 illustrate menu lists within a satellite connected to a digital broadcast receiver.

Figure 6 is a flowchart illustrating a one-touch channel setting procedure in a digital broadcast receiver according to an embodiment of the invention.
Figure 7 is a flowchart illustrating a one-touch channel setting procedure in a digital broadcast receiver according to another embodiment of the invention.

Figure 8 is a block diagram illustrating a digital broadcast receiver according to an embodiment of the invention.

DETAILED DESCRIPTION

As the present invention allows for various changes and numerous embodiments, particular embodiments will be illustrated in drawings and described in detail in the written description. However, this is not intended to limit the present invention to particular modes of practice, and it is to be appreciated that all changes, equivalents, and substitutes that do not depart from the spirit and technical scope of the present invention are encompassed in the present invention.

While terms including ordinal numbers, such as “first” and “second,” etc., may be used to describe various components, such components are not limited to the above terms. The above terms are used only to distinguish one component from another. For example, a first component may be referred to as a second component without departing from the scope of rights of the present invention, and likewise a second component may be referred to as a first component. The term “and/or” encompasses both combinations of the plurality of related items disclosed and any one item from among the plurality of related items disclosed.

When a component is mentioned to be “connected” to or “accessing” another component, this may mean that it is directly connected to or accessing the other component, but it is to be understood that another component may exist in-between. On the other hand, when a component
is mentioned to be "directly connected" to or "directly accessing" another component, it is to be understood that there are no other components in-between.

The terms used in the present specification are merely used to describe particular embodiments, and are not intended to limit the present invention. An expression used in the singular encompasses the expression of the plural, unless it has a clearly different meaning in the context. In the present specification, it is to be understood that the terms such as “including” or “having,” etc., are intended to indicate the existence of the features, numbers, operations, actions, components, parts, or combinations thereof disclosed in the specification, and are not intended to preclude the possibility that one or more other features, numbers, operations, actions, components, parts, or combinations thereof may exist or may be added.

Unless otherwise defined, all terms used herein, including technical or scientific terms, have the same meanings as those generally understood by those with ordinary knowledge in the field of art to which the present invention belongs. Such terms as those defined in a generally used dictionary are to be interpreted to have the meanings equal to the contextual meanings in the relevant field of art, and are not to be interpreted to have ideal or excessively formal meanings unless clearly defined in the present specification.

Certain embodiments of the invention will be described below in more detail with reference to the accompanying drawings, in which those components are rendered the same reference numeral that are the same or are in correspondence, regardless of the figure number, and redundant explanations are omitted.
Figure 2 is a chart illustrating the factors of available channel setting values according to an embodiment of the invention.

Referring to Figure 2, factors that form the channel setting values in certain embodiments of the invention may be divided mainly into conditions required for setting the antenna and conditions required for tuner selection.

In this embodiment, the conditions for antenna setting include satellite information and LNB (low-noise block converter) information, etc. As described above, satellite information may include satellite names, while LNB information may include LNB frequency values and LNB voltage values, etc.

Here, the LNB may serve to convert the high frequencies, of about 4 to 12 GHz, transmitted from satellites to intermediate frequencies, of about 1 GHz, and may be positioned at the center of the antenna.

Also, DiSEqC switch input values and whether or not 22 KHz tone is used (on/off), etc., may be included as antenna setting conditions. Of course, the embodiment is not limited to the above factors, and it is apparent to those skilled in the art that factors may be added or omitted later.

Here, the DiSEqC switch is a device which automatically chooses an antenna when there are several antennas. One DiSEqC switch may typically be made with two ports or four ports, and can thus accommodate up to two or four satellite antennas. Here, a DiSEqC switch input value corresponds to a value representing each port.

Also, 22 KHz tone may be chosen from a use (on) mode or a non-use (off) mode.
Tuner selection refers to selecting which tuner the antenna is connected to, when there are multiple tuners.

In this specification, each combination of channel setting factors, such as the satellite information, LNB information, use of 22 KHz tone, DiSEqC switch input value, and tuner, etc., described above, will be referred to as a "channel setting value". For example, the antenna may be set with the conditions of using koreasat for the satellite name, 10600 MHz for the LNB frequency, port A selected for the DiSEqC switch input value, and not using 22 KHz tone, while the antenna thus set may be set to be connected to the first tuner, to produce a channel setting value.

Figures 3 to 5 illustrate menu lists within a satellite connected to a digital broadcast receiver.

Referring to Figures 3 to 5, each satellite may have one or more transponders (TP). The transponder is a satellite relay device, which receives communications transmitted from a ground broadcast station, amplifies them within the satellite, and then retransmits them to the ground. Each transponder may typically relay a plurality of channels. While the group of multiple channels relayed by a transponder may carry the same signal characteristics, referred to as transponder information, different transponders may carry different transponder information, even within the same satellite.

Here, transponder information relates to the signal characteristics of a transponder, and may include one or more of frequency, frequency, symbol rate, FEC (forward error correction) value, and polarization, etc.
Each satellite that relays digital satellite broadcast signals typically has dozens of transponders installed, which may be referred to in a transponder list. While there is no limit on the number, several to several tens of channels may be set in a transponder, within a range allowed by the data transmission rate for the transmitted signals. By way of the multiple channels set as described above, a variety of digital satellite broadcast signals may be received by the digital broadcast receiver.

Within the digital broadcast receiver, the satellite broadcast information may be managed and operated for each satellite, where the sub-items related to satellite 1 from among the plurality of satellites may be, for example, composed of channels (CH 11 – CH 11L) as illustrated in Figure 3, or composed of transponders (TP 1 – TP M) included in satellite 1, as illustrated in Figure 4. Also, the sub-items of TP 1 may, as illustrated in Figure 5, be composed of channels (CH 111 – CH 111L) included in TP 1.

Figure 6 is a flowchart illustrating a one-touch channel setting procedure in a digital broadcast receiver according to an embodiment of the invention.

Referring to Figure 6, when a particular key is inputted according to a one-touch channel setting function activation command, the digital broadcast receiver, in operation 210, may produce combinable channel setting values using the channel setting factors.

Here, the channel setting values may vary according to how each of the conditions is combined. As an example, assume that the maximum number of satellites supported by the digital broadcast receiver is K, the maximum number of LNB frequencies is L, the maximum number of
DiSEqC switch input values is M, the possible number of cases on whether or not 22 KHz tone is used is 2 (on or off), and the maximum number of tuners equipped in the digital broadcast receiver is N. Then, the maximum number of combinations for the channel setting values may be K x L x M x 2 x N.

In this specification, such possible combinations for channel setting values will be referred to as “available channel setting values”. Thus, as described above, the number of available channel setting values may be K x L x M x 2 x N.

In operation 220, the digital broadcast receiver may choose an applied channel setting value from among the available channel setting values produced. Here, the term “applied channel setting value” used in certain embodiments of the invention has been coined for convenient description, and refers to a channel setting value that has been chosen for tuning from among the available channel setting values.

After all possible combinations of available channel setting values are produced using the factors for channel setting in operation 210 described above, operation 220 may be proceeded with. Of course, it is possible to produce just one available channel setting value and use it as the applied channel setting value.

In operation 230, the digital broadcast receiver may tune the tuner corresponding to the applied channel setting value, by referencing the transponder list of the satellite corresponding to the chosen applied channel setting value. Here, one satellite and one tuner may be selected from a channel setting value.

As described above, the transponder list refers to the collection of each transponder, and
each transponder may have different transponder information. Therefore, a tuner equipped in the
digital broadcast receiver may be tuned by sequentially receiving as input each of the transponder
information of the transponder list corresponding to the satellite selected when setting the
antenna.

Afterwards, in operation 240, the digital broadcast receiver may determine whether or not
the tuning using each of the transponder information of the transponder list is successful. This
may be performed by having the digital broadcast receiver attempt tuning for all transponder
information on the transponder list for the satellite that corresponds to the applied channel setting
value and then produce the transponder information for which tuning is successful, and
afterwards proceed to operation 250 with the successful transponder information.

Alternately, the digital broadcast receiver may sequentially determine whether or not tuning
is successful for each of the transponder information, and if one transponder information leads to
a successful tuning, the digital broadcast receiver may proceed immediately to operation 250.
Although it is not illustrated in detail in Figure 6, if it is determined in operation 250 that the
currently tuned transponder information is not a signal of the satellite corresponding to the
applied channel setting value, the digital broadcast receiver may repeat operation 240 using the
remaining transponder information of the transponder list corresponding to the satellite
corresponding to the applied channel setting value.

If the results of operation 240 show that tuning is not successful for any of the transponder
information of the transponder list corresponding to the satellite selected during the antenna
setting, the digital broadcast receiver may first determine whether or not the current applied
channel setting value is the last one of the available channel setting values.

If it is the last one, the channel setting procedure may be ended, but if it is not the last one, the digital broadcast receiver may, in operation 290, repeat the channel setting procedure by removing the applied channel setting value and choosing another applied channel setting value from among the remaining available channel setting values.

If the results of operation 240 show that tuning is successful for a transponder information, the digital broadcast receiver may check in operation 250 whether or not the signal tuned according to the applied channel setting value matches the signal information of the actual corresponding transponder. Here, it is assumed that the signal information of the transponder is pre-stored in the digital broadcast receiver.

This may be performed by determining whether or not the signal outputted as a result of the tuning is the same signal as the PSI data, as defined by ISO/IEC 13181-1, or the SI data, as defined by ETSI EN 300 468, of the transport stream of the actual transponder.

Here, PSI is program specific information involving tables for controlling a program transmitted using an MPEG-2 transport stream. PSI is defined in ISO/IEC 13818-1, while SI is defined in ETSI EN 300 468.

One of the reasons for checking whether or not the tuned signal is really a signal of a transponder of the satellite corresponding to the applied channel setting value may be that, with greater numbers of transponders on the satellites, there may be occasions where there is overlapping tuning information (frequency, symbol rate, FEC, polarization, etc.) between satellites within the general input frequency range for tuners of around 950 to 2150 MHz. In
other words, it may be to prevent those cases where tuning is successful for a signal that is not in fact a signal of a transponder of a satellite corresponding to the applied channel setting value, which results in incorrect antenna setting and tuner selection.

If it is determined, by the result of the checking in operation 260, that the tuned signal of the transponder matches the stored transponder signal information, the digital broadcast receiver sets the antenna and selects the tuner in operation 270 according to the applied channel setting value. That is, the channel setting is completed according to the channel setting value of interest. Thus, with this embodiment, channel setting may be performed without additional input from the user.

If the tuned signal of the transponder and the stored transponder signal information do not actually match, the process may proceed to operation 280 as illustrated in Figure 6.

In operation 280, the digital broadcast receiver may check whether the channel setting procedure has been attempted for all of the available channel setting values. If there is still an available channel setting value remaining for which tuning has not been attempted, the digital broadcast receiver may return from operation 290 to operation 220, whereas if tuning attempts have been made up to the last available channel setting value, the one-touch channel setting procedure may be ended.

It is apparent to those skilled in the art that a channel searching procedure may follow, in which channels corresponding to the received satellite signal are searched and stored.

In a product having two or more tuners, a procedure may be performed for setting channels by tuning each tuner simultaneously using a different applied channel setting value. This may provide the advantage that the time required for channel setting may be reduced overall compared
to performing the channel setting procedure sequentially for each tuner.

Of course, when attempting simultaneous tuning in multiple tuners, it is apparent that each tuner may be controlled not to use the same applied channel setting value, and that the applied channel setting value used in one tuner may be excluded from use in another tuner.

As presented above, according to this embodiment, a user is able to complete the antenna setting and tuner selection of the digital broadcast receiver with just one key input. This is described in this specification as a one-touch method. That is, the user can complete the channel setting procedure by inputting a command just once, and this one-touch method of setting channels can thus increase convenience.

Figure 7 is a flowchart illustrating a one-touch channel setting procedure in a digital broadcast receiver according to another embodiment of the invention.

In Figure 7, operations 310 to 390 are in correspondence with operations 210 to 290 of Figure 6, and thus will not be described in further detail. However, it should be noted that operation 280 of Figure 6 is in correspondence with operation 380 and operation 385 of Figure 7.

Unlike the embodiment described with reference to Figure 6, in the digital broadcast receiver according to this embodiment, if the antenna and tuner are set according to one applied channel setting value, those channel setting values that have the same tuner information and DiSEqC switch input value as the applied channel setting value, from among the remaining available channel setting values, may be excluded from being candidates for applied channel setting values, i.e. excluded from the tuning.

To be more specific, if the applied channel setting value with which the antenna and tuner
are set is not the last one of the channel setting values, the digital broadcast receiver may, in operation 400, exclude all of the other available channel setting values that have the same tuner information and DiSEqC switch input value as the set channel setting value and may proceed with the channel setting procedure with another applied channel setting value chosen from among the remaining available channel setting values. On the other hand, if the applied channel setting value is the last one, the one-touch channel setting procedure may be ended.

As such, in this embodiment, the number of available channel setting values for which tuning is attempted (i.e. the number of applied channel setting values) may be relatively fewer than in the embodiment illustrated in Figure 6.

This utilizes the principle that a DiSEqC switch has only one antenna setting per tuner. That is, in this embodiment, tuning attempts are not made for all other satellites that are included in combinations having the same tuner information as the DiSEqC switch input value already found.

With this embodiment also, a product having two or more tuners may utilize a procedure of setting channels in which the multiple tuners are tuned simultaneously using different available channel setting values.

Figure 8 is a block diagram illustrating a digital broadcast receiver according to an embodiment of the invention.

As illustrated in Figure 8, a digital broadcast receiver according to this embodiment may include a tuner unit 10, a control unit 20, a transponder information storage unit 30, and a channel information storage unit 40.
A high-frequency signal inputted from the antenna may be received by the tuner unit 10 as a signal converted by the LNB, at which the tuner unit 10 may extract video and audio signals, etc., and transmit the extracted signals to a television, etc.

The control unit 20 may operate when there is a channel setting request inputted from a user, or according to a preconfigured period, to reference a transponder list corresponding to available channel setting values that can be combined using channel setting factors and tune the tuner corresponding to the applied channel setting value.

Also, the control unit 20 may control the overall operation of the digital broadcast receiver. For example, if tuning is successful in each tuner, the control unit 20 may check whether or not the tuned signal of the transponder from the transponder list matches the pre-stored signal information corresponding to the satellite, and if the results indicate a match, may set the antenna and tuner to correspond with the chosen applied channel setting value.

The channel information storage unit 40 may read and process the PSI/SI of the transponder signal which results in successful tuning for a tuner, to form and store as channel information. The channel information storage unit 40 may be implemented for example as a memory device, such as RAM, flash memory, and a hard disk, etc.

The transponder information storage unit 30 may be a storage device for storing the information of satellites connected to the digital broadcast receiver, the transponder lists of these satellites, and each of the transponder information. Here, the transponder list of a satellite and each of the transponder information may be pre-stored in the digital broadcast receiver, for example by referencing a web site such as http://www.lyngsat.com/ and http://www.satcodx.com/,
in which satellite information is updated.

As presented above, certain aspects of the invention can automate the procedures of setting the antenna and selecting the tuner in searching channels. That is, a user can complete a channel setting procedure by inputting a command just once, and this one-touch method of channel setting can thus increase user convenience.

Also, with certain aspects of the invention, the procedures of setting the antenna and tuner can be performed automatically, so that a user can be saved effort and costs when first installing the digital broadcast receiver or changing channels, and can select and receive the desired broadcast channels quickly and efficiently.

While the spirit of the invention has been described in detail with reference to particular embodiments, the embodiments are for illustrative purposes only and do not limit the invention. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the invention.
What is claimed is:

1. A one-touch channel setting method enabling channel setting in a digital broadcast receiver, the method comprising:

   (a) tuning a tuner corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value; and

   (b) setting an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result.

2. The method of claim 1, wherein the operation (a) comprises:

   producing available channel setting values from combinations of channel setting value factors;

   choosing an applied channel setting value from the available channel setting values; and

   tuning a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.

3. The method of claim 1, wherein the operation (b) comprises:

   determining, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite; and

   setting the antenna and the tuner to correspond with the applied channel setting value, only
if the determination result indicates a match,

and, if there is no match, the method proceeds again to the operation (a) with the applied channel setting value removed.

4. The method of claim 3, wherein the operation (b) comprises proceeding again to the operation (a) with the applied channel setting value removed, if the tuning is unsuccessful.

5. The method of claim 3, wherein the determining is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.

6. The method of claim 5, wherein the PSI/SI data of the stored transponder signal information and the signal of the transponder are pre-stored in the digital broadcast receiver.

7. The method of claim 1, wherein the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information.

8. The method of claim 7, wherein the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used.

9. The method of claim 7, wherein the operation (a) is repeated for a number of all possible
combinations of the available channel setting values.

10. The method of claim 9, wherein the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners.

11. The method of claim 10, wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the operation (a).

12. The method of claim 1, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the operation (a) using a different applied channel setting value.

13. A digital broadcast receiver comprising:

a tuner unit having one or more tuners and configured to tune a signal inputted from an antenna;

a control unit configured to tune a tuner corresponding to an applied channel setting value chosen from available channel setting values made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and
configured to set an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result; and

a channel information storage unit configured to process a signal of a transponder tuned by the tuner and store as channel information.

14. The digital broadcast receiver of claim 13, wherein the control unit is configured to produce available channel setting values from combinations of channel setting value factors, choose an applied channel setting value from the available channel setting values, and tune a tuner corresponding to the applied channel setting value by referencing a transponder list of a satellite corresponding to the chosen applied channel setting value.

15. The digital broadcast receiver of claim 14, wherein the control unit is configured to:

determine, if the tuning is successful, whether or not the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite,

set the antenna and the tuner to correspond with the applied channel setting value, only if the determination result indicates a match, and repeat a channel setting procedure with the applied channel setting value removed, if there is no match,

and repeat a channel setting procedure with the applied channel setting value removed, if the tuning is unsuccessful.
16. The digital broadcast receiver of claim 13, wherein the available channel setting value is produced to correspond to channel setting value factors including satellite information, LNB information, and tuner information.

17. The digital broadcast receiver of claim 16, wherein the channel setting value factors further include DiSEqC switch value and whether or not 22 KHz tone is used.

18. The digital broadcast receiver of claim 15, wherein the channel setting procedure is repeated for a number of all possible combinations of the available channel setting values.

19. The digital broadcast receiver of claim 18, wherein the number of all possible combinations is calculated by multiplying a number of satellite information, a number of LNB information, a number of DiSEqC switch values, a number of possible cases on whether or not 22 KHz tone is used, and a number of tuners.

20. The digital broadcast receiver of claim 19, wherein, if any one combination of antenna and tuner is set, other channel setting values having the same tuner information and DiSEqC switch input value as those of the set available channel setting value are excluded from the channel setting procedure.

21. The digital broadcast receiver of claim 15, wherein the determining, of whether or not
the tuned signal of a transponder from the transponder list matches pre-stored signal information of a transponder corresponding to the satellite, is performed by comparing PSI/SI data of the stored transponder signal information and the signal of the transponder.

22. The digital broadcast receiver of claim 21, further comprising a transponder information storage unit configured to store the PSI/SI data of the signal of the transponder and the transponder list.

23. The digital broadcast receiver of claim 13, wherein, if the digital broadcast receiver has a plurality of tuners, each tuner is tuned simultaneously in the tuning using a different applied channel setting value.
Abstract

A digital broadcast receiver and a one-touch channel setting method are disclosed. In order to set channels, the digital broadcast receiver tunes a tuner corresponding to an applied channel setting value chosen from available channel setting values that are made from combinations of channel setting value factors by referencing a transponder list corresponding to the applied channel setting value, and sets an antenna and a tuner to correspond with the applied channel setting value in accordance with the tuning result. Thus, the antenna and tuner may be set automatically for searching channels.
FIG. 1

start

display UI screen

set antenna in correspondence with inputted values

select tuner in correspondence with inputted values

channel search channel

successful?

yes

end

no

110 120 130 140 150
FIG. 2

Factors for channel setting
1. satellite name → {Hotbird, Astra, Uilesat, ...}
2. LNB frequency → {Universal, 10600, ...}
3. DiSEqC switch input value → {A, B, C, D, ...}
4. 22 Khz tone → {On, Off}
5. Tuner → {1, 2, 3, ...}
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</tr>
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### FIG. 4

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## FIG. 5

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FIG. 6

start

produce available channel setting values

choose one applied channel setting value

sequentially tune tuners by referencing applied channel setting value and corresponding TP list

exclude chosen applied channel setting value

290

tuning successful?

yes

check whether or not tuned TP signal matches TP signal corresponding to applied channel setting value

no

TP signals match?

yes

set antenna and tuner

no

last available channel setting value?

yes

end

210

220

230

240

250

260

270

280
FIG. 7

start

produce available channel setting values 310

choose one applied channel setting value 320

exclude chosen applied channel setting value 390

sequentially tune tuners by referencing applied channel setting value and corresponding TP list 330

exclude channel setting values that include tuner information and DiSEqC switch input value of applied channel setting value 400

tuning successful? 340

no

check whether or not tuned TP signal matches TP signal corresponding to applied channel setting value 350

TP signals match? 360

no

set antenna and tuner 370

yes

yes

last available channel setting value? 385

no

yes

380

end
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<tr>
<td><strong>MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))</strong></td>
<td><strong>N/A</strong></td>
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</table>

* If the difference in column 1 is less than zero, enter "0" in column 2.

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<tr>
<th><strong>SMALL ENTITY</strong></th>
<th><strong>OTHER THAN SMALL ENTITY</strong></th>
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<tbody>
<tr>
<td><strong>RATE ($)</strong></td>
<td><strong>FEE ($)</strong></td>
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<tr>
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<table>
<thead>
<tr>
<th><strong>AMENDMENT A</strong></th>
<th><strong>CLAIMS REMAINING</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>AFER AMENDMENT</strong></td>
<td><strong>PRESENT</strong></td>
</tr>
<tr>
<td><strong>NUMBER</strong></td>
<td><strong>NUMBER</strong></td>
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<tr>
<td><strong>TOTAL</strong></td>
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<tr>
<td><strong>INDEPENDENT</strong></td>
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<tr>
<td><strong>APPLICATION SIZE FEE (37 CFR 1.16(a))</strong></td>
<td><strong>N/A</strong></td>
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<td><strong>FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))</strong></td>
<td><strong>N/A</strong></td>
</tr>
<tr>
<td><strong>AMENDMENT A</strong></td>
<td><strong>ADDITIONAL FEE ($)</strong></td>
</tr>
<tr>
<td><strong>RATE ($)</strong></td>
<td><strong>ADDITIONAL FEE ($)</strong></td>
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<tr>
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<td><strong>TOTAL ADD'T FEE</strong></td>
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<tr>
<td><strong>AMENDMENT B</strong></td>
<td><strong>CLAIMS REMAINING</strong></td>
</tr>
<tr>
<td><strong>AFER AMENDMENT</strong></td>
<td><strong>PRESENT</strong></td>
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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".

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.