APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
--- | --- | --- | --- | --- |
12/094,376 | 10/04/2011 | 8032074 | EZ-00007 | 1823 |
34610 | 7590 | 09/14/2011 |

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

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

The Patent Term Adjustment is 664 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):

Jun-Hyung Kim, Gyeonggi-do, KOREA, REPUBLIC OF;
Ho Yi, Gyeonggi-do, KOREA, REPUBLIC OF;
Min-Haeng Cho, Gyeonggi-do, KOREA, REPUBLIC OF;
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.

34610 7590 05/26/2011
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

APPLICATION NO. 12/094,276
FILING DATE 05/20/2008
FIRST NAMED INVENTOR Jun-Hyung Kim
ATTORNEY DOCKET NO. EZ-0007
CONFIRMATION NO. 1823

TITLE OF INVENTION: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

<table>
<thead>
<tr>
<th>APPL. TYPE</th>
<th>SMALL ENTITY</th>
<th>ISSUE FEE DUE</th>
<th>PUBLICATION FEE DUE</th>
<th>PREV. PAID ISSUE FEE</th>
<th>TOTAL FEE(S) DUE</th>
<th>DATE DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonprovisional</td>
<td>NO</td>
<td>$1510</td>
<td>$300</td>
<td>$0</td>
<td>$1810</td>
<td>08/26/2011</td>
</tr>
</tbody>
</table>

EXAMINER TRINH, TAN H
ART UNIT 2618
CLASS-SUBCLASS 455-003020

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.263).

☐ 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.

☐ KED & ASSOCIATES LLP

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 recording 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, Gyeonggi-do, Republic of Korea

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 $1510.00

☐ Publication Fee (No small entity discount permitted) $300.00

☐ Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.

☐ Payment by credit card. 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 16-0607 (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 record of the United States Patent and Trademark Office.

Authorized Signature

Tyed or printed name Carol L. Druzhick

Date August 23, 2011
Registration No. 40,287

This collection of information is required by 37 CFR 1.111. 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.

PTOL-85 (Rev. 02/11) Approved for use through 08/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
## Electronic Patent Application Fee Transmittal

<table>
<thead>
<tr>
<th>Application Number:</th>
<th>12094376</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filing Date:</td>
<td>20-May-2008</td>
</tr>
<tr>
<td>Title of Invention:</td>
<td>METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER</td>
</tr>
<tr>
<td>First Named Inventor/Applicant Name:</td>
<td>Jun-Hyung Kim</td>
</tr>
<tr>
<td>Filer:</td>
<td>Carol Lynn Druzbick/Tracy Green</td>
</tr>
<tr>
<td>Attorney Docket Number:</td>
<td>EZ-0007</td>
</tr>
<tr>
<td>Filed as Large Entity</td>
<td></td>
</tr>
</tbody>
</table>

### U.S. National Stage under 35 USC 371 Filing Fees

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee Code</th>
<th>Quantity</th>
<th>Amount</th>
<th>Sub-Total in USD($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Filing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pages:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claims:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous-Filing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petition:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent-Appeals-and-Interference:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Allowance-and-Post-Issuance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility Appl issue fee</td>
<td>1501</td>
<td>1</td>
<td>1510</td>
<td>1510</td>
</tr>
<tr>
<td>Publ. Fee- early, voluntary, or normal</td>
<td>1504</td>
<td>1</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Description</td>
<td>Fee Code</td>
<td>Quantity</td>
<td>Amount</td>
<td>Sub-Total in USD($)</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Extension-of-Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total in USD ($)</strong></td>
<td></td>
<td></td>
<td>1810</td>
<td></td>
</tr>
</tbody>
</table>
# Electronic Acknowledgement Receipt

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EFS ID:</strong></td>
<td>10790328</td>
</tr>
<tr>
<td><strong>Application Number:</strong></td>
<td>12094376</td>
</tr>
<tr>
<td><strong>International Application Number:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Confirmation Number:</strong></td>
<td>1823</td>
</tr>
<tr>
<td><strong>Title of Invention:</strong></td>
<td>METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER</td>
</tr>
<tr>
<td><strong>First Named Inventor/Applicant Name:</strong></td>
<td>Jun-Hyung Kim</td>
</tr>
<tr>
<td><strong>Customer Number:</strong></td>
<td>34610</td>
</tr>
<tr>
<td><strong>Filer:</strong></td>
<td>Carol Lynn Druzblck/Tracy Green</td>
</tr>
<tr>
<td><strong>Filer Authorized By:</strong></td>
<td>Carol Lynn Druzblck</td>
</tr>
<tr>
<td><strong>Attorney Docket Number:</strong></td>
<td>EZ-0007</td>
</tr>
<tr>
<td><strong>Receipt Date:</strong></td>
<td>23-AUG-2011</td>
</tr>
<tr>
<td><strong>Filing Date:</strong></td>
<td>20-MAY-2008</td>
</tr>
<tr>
<td><strong>Time Stamp:</strong></td>
<td>09:16:38</td>
</tr>
<tr>
<td><strong>Application Type:</strong></td>
<td>U.S. National Stage under 35 USC 371</td>
</tr>
</tbody>
</table>

## Payment information:

<table>
<thead>
<tr>
<th>Submitted with Payment</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Payment Type</strong></td>
<td>Credit Card</td>
</tr>
<tr>
<td><strong>Payment was successfully received in RAM</strong></td>
<td>$1810</td>
</tr>
<tr>
<td><strong>RAM confirmation Number</strong></td>
<td>7447</td>
</tr>
<tr>
<td><strong>Deposit Account</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Authorized User</strong></td>
<td></td>
</tr>
</tbody>
</table>

## File Listing:

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Document Description</th>
<th>File Name</th>
<th>File Size(Bytes)/Message Digest</th>
<th>Multi Part .zip</th>
<th>Pages (if appl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94683</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Warnings:**

**Information:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>32319</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

**Warnings:**

**Information:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>127002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**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/OEO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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

34610 7590 05/26/2011
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EXAMINER
TRINH, TAN H
ART UNIT 2618
PAPER NUMBER

DATE MAILED: 05/26/2011

APPLICATION NO. 12/094,376
FILING DATE 05/20/2008
FIRST NAMED INVENTOR Ju-Hyung Kim
ATTORNEY DOCKET NO. EZ-0007
CONFIRMATION NO. 1823

TITLE OF INVENTION: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

<table>
<thead>
<tr>
<th>APPLN. TYPE</th>
<th>SMALL ENTITY</th>
<th>ISSUE FEE DUE</th>
<th>PUBLICATION FEE DUE</th>
<th>PREV. PAID ISSUE FEE</th>
<th>TOTAL FEE(S) DUE</th>
<th>DATE DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonprovisional</td>
<td>NO</td>
<td>$1510</td>
<td>$300</td>
<td>$0</td>
<td>$1810</td>
<td>08/26/2011</td>
</tr>
</tbody>
</table>

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

   If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:
   A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
   B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

   If the SMALL ENTITY is shown as NO:
   A. Pay TOTAL FEE(S) DUE shown above, or
   B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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

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

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

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

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

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

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

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

34610 7590 05/26/2011

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.

Date

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.

12/094,376 05/20/2008 Jun Hyung Kim EZ-0007 1823

TITLE OF INVENTION: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

<table>
<thead>
<tr>
<th>APPLN. TYPE</th>
<th>SMALL ENTITY</th>
<th>ISSUE FEE DUE</th>
<th>PUBLICATION FEE DUE</th>
<th>PREV. PAID ISSUE FEE</th>
<th>TOTAL FEE(S) DUE</th>
<th>DATE DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>provisional</td>
<td>NO</td>
<td>$1510</td>
<td>$300</td>
<td>$0</td>
<td>$1810</td>
<td>08/26/2011</td>
</tr>
</tbody>
</table>

EXAMINER | ART UNIT | CLASS-SUBCLASS |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TRINH, TAN H</td>
<td>2618</td>
<td>455-003020</td>
</tr>
</tbody>
</table>

1. Change of correspondence address or indication of “Fee Address” (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTOLSB/122) attached.

☐ “Fee Address” indication (or “Fee Address” Indication form PTOLSB/47, Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

1. the names of up to 3 registered patent attorneys or agents OR, alternatively,

2. the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

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

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

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

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

4. 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.

PTOL-85 (Rev. 02/11) Approved for use through 08/31/2013.

OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
**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 527 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 527 day(s).

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

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

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

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency’s responsibility to recommend improvements in records management 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

**Application No.** 12/094,376  
**Applicant(s)** KIM ET AL.  
**Examiner** TAN TRINH  
**Art Unit** 2618

---

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

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

1. ☒ This communication is responsive to **03-25-2011**.
2. ☒ The allowed claim(s) is/are **1,2,4-16 and 18-26**.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   - a) ☒ All   b) ☐ Some*  c) ☐ None  of the:
     1. ☒ Certified copies of the priority documents have been received.
     2. ☐ Certified copies of the priority documents have been received in Application No. _____.
     3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
   
   * Certified copies not received: _____.

   Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ 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.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   - a) ☐ including changes required by the Notice of Draftsman’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).

6. ☐ 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 _____.
DETAILED ACTION

Allowable Subject Matter

1. Claims 1-2, 4-16 and 18-26 are allowed.

Reasons for allowance

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

Regarding independent claims 1 and 14, the claims have been written including all of the limitations of the base claims and intervening claims 3 and 17, therefore, claims 1 and 14 are allowable with the same reasons set forth in the previous Office action (paper mailed on 12-29-2010)

Regarding independent claims 7 and 18-25, the claims have been written in independent forms including all of the limitations of the base claims and intervening claims, therefore, claims 7 and 18-25 are allowable with the same reasons set forth in the previous Office action (paper mailed on 12-29-2010).

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

3. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:
Hand-delivered responses should be brought to the Customer Service Window (now located at the Randolph Building, 401 Dulaney Street, Alexandria, VA 22314).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tan Trinh whose telephone number is (571) 272-7888. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

   If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor, Ghebretinsae, Temesghen; can be reached at (571) 272-3017.

   The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

   Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

5. 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.
Tan H. Trinh
Division 2618
May 21, 2011

/TAN TRINH/
Primary Examiner, Art Unit 2618
**Notice of References Cited**

**U.S. PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>*</th>
<th>Document Number</th>
<th>Date MM-YYYY</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>US-2008/0134243</td>
<td>06-2008</td>
<td>Klosterman, Brian Lee</td>
<td>725/44</td>
</tr>
<tr>
<td></td>
<td>US-2004/0068751</td>
<td>04-2004</td>
<td>Basawapatna et al.</td>
<td>725/117</td>
</tr>
<tr>
<td></td>
<td>US-7,945,932</td>
<td>05-2011</td>
<td>James et al.</td>
<td>725/68</td>
</tr>
</tbody>
</table>

**FOREIGN PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>*</th>
<th>Document Number</th>
<th>Date MM-YYYY</th>
<th>Country</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
</table>

| N | O | P | Q | R | S | T |

**NON-PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>*</th>
<th>Document Number</th>
<th>Date MM-YYYY</th>
<th>Country</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
</table>

| U | V | W | X |

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

Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)
## EAST Search History
### EAST Search History (Prior Art)

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Hits</th>
<th>Search Query</th>
<th>DBs</th>
<th>Default Operator</th>
<th>Plurals</th>
<th>Time Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>L17</td>
<td>1</td>
<td>&quot;20080276288&quot;.pn.</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:14</td>
</tr>
<tr>
<td>L18</td>
<td>7</td>
<td>(direct adj TV) and (second adj tuner)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:27</td>
</tr>
<tr>
<td>L19</td>
<td>5</td>
<td>18 and (satellite adj receiver)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:32</td>
</tr>
<tr>
<td>L20</td>
<td>0</td>
<td>19 and ((set-top-box) STB)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:32</td>
</tr>
<tr>
<td>L21</td>
<td>2</td>
<td>18 and ((set-top-box) STB)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:32</td>
</tr>
<tr>
<td>L22</td>
<td>0</td>
<td>19 and 21</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:32</td>
</tr>
<tr>
<td>L23</td>
<td>0</td>
<td>19 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:34</td>
</tr>
<tr>
<td>L24</td>
<td>0</td>
<td>18 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:34</td>
</tr>
<tr>
<td>L25</td>
<td>0</td>
<td>21 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:34</td>
</tr>
<tr>
<td>L26</td>
<td>2</td>
<td>21 and (second adj tuner)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:35</td>
</tr>
<tr>
<td>L27</td>
<td>0</td>
<td>26 and (independent adj tune)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:35</td>
</tr>
<tr>
<td>L28</td>
<td>137</td>
<td>(first adj tuner) and (second adj tuner) and (satellite adj signal)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:37</td>
</tr>
<tr>
<td>L29</td>
<td>61</td>
<td>28 and identical</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:38</td>
</tr>
<tr>
<td>L30</td>
<td>2</td>
<td>29 and extract$2 and ((profram specification adj information) PSI)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:39</td>
</tr>
<tr>
<td>L31</td>
<td>6</td>
<td>28 and extract$2 and ((profram specification adj information) PSI)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:41</td>
</tr>
<tr>
<td>L32</td>
<td>0</td>
<td>31 and (independent adj tune)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:42</td>
</tr>
<tr>
<td>L33</td>
<td>4</td>
<td>31 and (setting adj2tuner adj connect $3)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:42</td>
</tr>
<tr>
<td>L34</td>
<td>0</td>
<td>31 and (setting adj2tuner adj connect$3)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:42</td>
</tr>
<tr>
<td>L35</td>
<td>0</td>
<td>31 and (set$4 adj2tuner adj connect$3)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:43</td>
</tr>
<tr>
<td>L36</td>
<td>1</td>
<td>19 and extract$2 and ((profram specification adj information) PSI)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:43</td>
</tr>
<tr>
<td>L37</td>
<td>0</td>
<td>(set$4 adj2 tuner) and (connect$3 adj state) and (satellite adj2 loop-through)</td>
<td>US-PGWUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2011/05/21 14:47</td>
</tr>
</tbody>
</table>
### EAST Search History (Interference)

*This search history is empty*

5/21/11 2:52:51 PM
### Issue Classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Claimed</th>
<th>Non-Claimed</th>
</tr>
</thead>
<tbody>
<tr>
<td>455</td>
<td>3.02</td>
<td>H 0 4 H</td>
<td>1 / 00 []</td>
</tr>
</tbody>
</table>

### Cross Reference(s)

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass (One Subclass per Block)</th>
</tr>
</thead>
<tbody>
<tr>
<td>455</td>
<td>3.06 12.1 125 187.1</td>
</tr>
<tr>
<td>725</td>
<td>66 44</td>
</tr>
<tr>
<td>348</td>
<td>731</td>
</tr>
</tbody>
</table>

### Claims Renumbered

- Claims renumbered in the same order as presented by applicant
- CPA
- T.D.
- R.1.47

<table>
<thead>
<tr>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
<th>Final</th>
<th>Original</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>16</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>17</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>18</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>19</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>20</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>21</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>22</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>23</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>24</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Total Claims Allowed:

24

(Primary Examiner)  
05/21/2011  
O.G. Print Claim(s)  
O.G. Print Figure  
1  
1  
Part of Paper No. 20110521  
U.S. Patent and Trademark Office
<table>
<thead>
<tr>
<th>CLAIM</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>Original</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>26</td>
</tr>
</tbody>
</table>
## SEARCHED

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>455</td>
<td>3.01, 3.02, 3.03, 3.04, 3.06, 12.1, 67.13, 132, 67.11, 179.1, 103, 137, 226.1, 67.1,125, 187.1</td>
<td>12-17-2010</td>
<td>TT</td>
</tr>
<tr>
<td>370</td>
<td>401, 312,</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>725</td>
<td>70, 68, 63, 78, 80, 44, 39, 71, 100, 131, 151, 118, 105, 148</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>EAST</td>
<td>see print out</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>348</td>
<td>731, E05.097</td>
<td>05-21-2011</td>
<td>TT</td>
</tr>
<tr>
<td>Update search</td>
<td>see print out</td>
<td>05-21-2011</td>
<td>TT</td>
</tr>
</tbody>
</table>

## SEARCH NOTES

<table>
<thead>
<tr>
<th>Search Notes</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAST</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>EAST</td>
<td>05-21-2011</td>
<td>TT</td>
</tr>
</tbody>
</table>

## INTERFERENCE SEARCH

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG-PUB.</td>
<td>Text search (see print out)</td>
<td>05-21-2011</td>
<td>TT</td>
</tr>
</tbody>
</table>
In reply to the Non-Final Office Action of December 29, 2010, please amend the above-identified application as follows:

Amendments to the Drawings are reflected in this paper and include both an attached replacement sheet and an annotated sheet showing changes.

Amendments to the Specification are reflected in this paper.

Amendments to the Claims are reflected in the listing of claims.

Remarks/Arguments begin after the listing of the claims.

An Appendix including amended drawing figures is attached following the last page of this paper.
AMENDMENTS TO THE DRAWINGS

The attached drawing includes changes to Fig. 10. This sheet, which includes Fig. 10, replaces the original sheet including Fig. 10. In Fig. 10, the word “tune” is changed to “tuner” in steps 1010 and 1020, to be consistent with the specification. No new matter is added.

Attachments: Replacement Sheet (1)
AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph on page 16, lines 11-14 with the following amended paragraph:

If the first tuner 210a and the second tuner 210b are tuned by the respective TP information of different polarization properties, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225,235 as the separate in a step represented by 615.

Please replace the paragraph on page 16, lines 15-18 with the following amended paragraph:

However, if the first tuner 210a and the second tuner 210b are not tuned by the respective TP information, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225,235 as the loop-through in a step represented by 620.

Please replace the paragraph on page 17, line 15-page 18, line 3 with the following amended paragraph:

Accordingly, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the first TP information and the second TP information received from each respective satellite. As a result of tuning them, if the first and second tuners 210a and 210b are independently tuned, the processor 240 determines that the connection state of each of the
tuners 210a and 210b between the present satellite K and the searched satellite N is the separate.

If the first tuner 210a and the second tuner 210b, respectively, are independently tuned, in a step represented by 630, the processor 240 writes in the memory–255,235 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the separate.

Please replace the paragraph on page 18, lines 4-7 with the following amended paragraph:

If the first tuner 210a and the second tuner 210b, respectively, are not independently tuned, in a step represented by 635, the processor 240 writes in the memory–255,235 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the loop-through.

Please replace the paragraph on page 22, lines 12-15 with the following amended paragraph:

If neither the first tuner 210a nor the second tuner 210b is tuned by using the same TP information, the processor 240 recognizes and writes in the memory 235 the connection state of the satellite x as the single tuner, using any one of the first tuner 210a and the second tuner 210b, in a step represented by 915.
AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of setting a tuner connection state of n satellites, n being a natural number, the n satellites being connected to one or more antennas, the method being executed in a digital broadcast receiver comprising a plurality of tuners, the method comprising:

   setting the tuner connection state for each-satellite of the n satellites by using a satellite signal received from each-satellite of the n satellites; and

   setting the tuner connection state of the plurality of tuners between the n satellites by using a connection state set for each-satellite of the n satellites and the satellite signal received from each-satellite of the n satellites, wherein setting the tuner connection state for each of the n satellites comprises:

   determining whether each of a first tuner and a second tuner is tuned by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite of the n satellites;

   when each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI
extracted from the first satellite signal inputted through the first tuner and the PSI or SI
extracted from the first satellite signal inputted through the second tuner are identical to each
other:

    tuning any one of the first tuner or the second tuner to a second satellite signal
having polarization properties different from the first satellite signal when it is determined that
the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI
or SI extracted from the first satellite signal inputted through the second tuner are identical to
each other; and

    setting the tuner connection state of the satellite as dual same when the first tuner
and the second tuner are tuned by the first satellite signal and the second satellite signal,
respectively.

2. (Currently Amended) The method of claim 1, wherein each of the respective
satellites comprises information on one antenna, and the antenna information comprises a
combination of at least one or more items of low noise block down converter information, 22
KHz tone information, satellite information— and or digital satellite equipment control
information.

3. (Canceled)
4. (Currently Amended) The method of claim 3.1, further comprising a step of setting the tuner connection state of the satellite as single tuner if \textit{when} any one of the first tuner and or the second tuner is not tuned to a the second satellite signal.

5. (Currently Amended) The method of claim 3.1, further comprising a step of setting the tuner connection state of the satellite as single tuner if \textit{when} the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are not identical to each other.

6. (Currently Amended) The method of claim 3.1, further comprising a step of setting the tuner connection state of the satellite as loop-through if any \textit{when} one of the first tuner and or the second tuner is tuned, and then the other of the first tuner or the second tuner is disconnected.

7. (Currently Amended) The method of claim 1, wherein the step of \textit{A method of setting a tuner connection state of n satellites, n being a natural number and the n satellites including at least first, second, third and fourth satellites, the n satellites being connected to one or more antennas, the method being executed in a digital broadcast receiver comprising a plurality of tuners, the method comprising:}
setting the tuner connection state for each of the n satellites by using a satellite signal received from each of the n satellites; and

setting the tuner connection state of the plurality of tuners between the n satellites by using a connection state set for each satellite comprises of the n satellites, comprising:

tuning each of the a first tuner and the a second tuner to the a third satellite signal;

extracting first program specification information (PSI) or first service information (SI) from the third satellite signal inputted through the first tuner;

tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal;

extracting second PSI or second SI from the third satellite signal inputted through the second tuner;

determining whether the extracted first PSI or first SI is identical to the extracted second PSI or second SI; and

setting the tuner connection state of the n satellites as dual different if when the extracted first PSI or first SI is identical to the extracted second PSI or second SI.

8. (Currently Amended) The method of claim 7, further comprising a step of setting the connection state between the n satellites as the a single tuner if when the extracted first PSI or first SI is not identical to the extracted second PSI or second SI.
9. (Currently Amended) The method of claim 7, further comprising a step of setting the tuner connection state between a the first satellite and a the second satellite as a first single tuner if when the tuner connection state of the first satellite is the first single tuner, and the tuner connection state of the second satellite is the first single tuner.

10. (Currently Amended) The method of claim 7, further comprising a step of setting the tuner connection state between a the first satellite and a the second satellite as dual different if when the tuner connection state of the first satellite is the loop-through, and the tuner connection state of the second satellite is dual same.

11. (Currently Amended) The method of claim 7, further comprising a step of setting the tuner connection state between a the first satellite and a the second satellite as the dual same if when the tuner connection state of the first satellite is the dual same, and the connection state of the second satellite is the dual same.

12. (Currently Amended) The method of claim 7, further comprising a step of setting the tuner connection state between a the first satellite and a the second satellite as the dual different if when the tuner connection state of the first satellite is any one of the first single tuner and the or second single tuner, and the tuner connection state of the second satellite is the dual same.
13. (Currently Amended) The method of claim 7, further comprising a step of setting the tuner connection state between a the first satellite and a the second satellite as the dual different if when the tuner connection state of the first satellite is the first single tuner, and the tuner connection state of the second satellite is the second single tuner.

14. (Currently Amended) A digital broadcast receiver, comprising:

a plurality of tuners, receiving from each antenna a satellite signal from each antenna transmitted from a satellite;

a demodulator[[,]] demodulating the satellite signal;

a demultiplexer[[,]] classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder[[,]] decoding each of the data classified by the demultiplexer; and

a processor[[,]] setting a tuner connection state corresponding to \( N \) satellites, \( N \) being a natural number and the \( N \) satellites, including at least first, second, third, fourth, fifth and sixth satellites, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each satellite of the \( N \) satellites, each satellite having information for one satellite, and then sets a tuner connection state between the \( N \) satellites by using the connection state set for each satellite of the \( N \) satellites, wherein when each of a first tuner and a second tuner is tuned to a fifth satellite signal, the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and
second tuner and determines whether the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, and when it is determined that the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, tunes one of the first tuner or the second tuner to a sixth satellite signal, the sixth satellite signal being a signal for a satellite that is different from the satellite of the fifth satellite signal, and then, when each of the first tuner and the second tuner is tuned by the fifth satellite signal and the sixth satellite signal, respectively, sets the tuner connection state of the satellite as dual same.

15. (Currently Amended) The digital broadcast receiver of claim 14, further comprising a memory storing the set tuner connection state between the \( N \) satellites.

16. (Currently Amended) The digital broadcast receiver of claim 14, wherein the processor tunes each of a the first tuner and a the second tuner by using a the fifth satellite signal received through a satellite, and if when any one of the first tuner and or the second tuner is not tuned, the processor sets the tuner connection of the satellite as a single tuner.

17. (Canceled)
18. (Currently Amended) The digital broadcast receiver of claim 17. A digital broadcast receiver, comprising:

a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

a demodulator demodulating the satellite signal;

a demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number and the N satellites, including at least first, second, third, fourth, fifth and sixth satellites, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the N satellites by using the connection state set for each of the N satellites, wherein the processor tunes any one of the first tuner and the or a second tuner to the a sixth satellite signal and then sets the tuner connection state of the satellite as loop-through if when any one of the first tuner and or the second tuner is not tuned.

19. (Currently Amended) The digital broadcast receiver of claim 17. A digital broadcast receiver, comprising:
a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

a demodulator demodulating the satellite signal;

a demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, and, if when it is determined that the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, sets the tuner connection state of the satellite as single tuner.

20. (Currently Amended) The digital broadcast receiver of claim 14. A digital broadcast receiver, comprising:
a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

a demodulator demodulating the satellite signal;

a demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein, if when the connection state of each of a third satellite of the N satellites and a fourth satellite of the N satellites is a first single tuner, the processor sets a tuner connection state between the third satellite and the fourth satellite as a first single tuner, and if when the connection state of each of the third satellite and the fourth satellite is a second single tuner, the processor sets the tuner connection state between the third satellite and the fourth satellite as a second single tuner.

21. (Currently Amended) The digital broadcast receiver of claim 14. A digital broadcast receiver, comprising:
a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

demodulator demodulating the satellite signal;
demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

decoder decoding each of the data classified by the demultiplexer; and

processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellite, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein, if when a connection state of a third satellite of the N satellites is any one of a first single tuner and a or second single tuner, and a connection state of a fourth satellite of the N satellites is the other of the first single tuner or second single tuner, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

22. (Currently Amended) The digital broadcast receiver of claim 14. A digital broadcast receiver, comprising:

a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;
a demodulator demodulating the satellite signal;

da demultiplexer classifying the demodulated satellite signal in accordance with data type
and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a
natural number, by use of the satellite signal inputted through the tuner, wherein the processor
sets a connection state of the tuner for each of the N satellites, each satellite having information
for one satellite, and then sets a tuner connection state between the satellites by using the
connection state set for each of the N satellites, wherein, if when a connection state of a third
satellite of the N satellites is any one of a first single tuner, a second single tuner and or loop-
through, and a connection state of a fourth satellite of the N satellites is dual same, the processor
sets a tuner connection state between the third satellite and the fourth satellite as dual different.

23. (Currently Amended)—The digital broadcast receiver of claim 14, A digital
broadcast receiver, comprising:

a plurality of tuners, receiving a satellite signal from each antenna transmitted from a
satellite;

a demodulator demodulating the satellite signal;

a demultiplexer classifying the demodulated satellite signal in accordance with data type
and outputting the classified data;
a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein, if when a connection state of a third satellite of the N satellites is dual same, and a connection state of a fourth satellite of the N satellites is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

24. (Currently Amended) - The digital broadcast receiver of claim 14, A digital broadcast receiver, comprising:

a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

da demodulator demodulating the satellite signal;

da demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor
sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein, if when a connection state of a third satellite of the N satellites is any one of a first single tuner and a or second single tuner, and a connection state of a fourth satellite of the N satellites is loop-through, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

25. (Currently Amended) The digital broadcast receiver of claim 14. A digital broadcast receiver, comprising:

a plurality of tuners, receiving a satellite signal from each antenna transmitted from a satellite;

a demodulator demodulating the satellite signal;

a demultiplexer classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder decoding each of the data classified by the demultiplexer; and

a processor setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner, wherein the processor sets a connection state of the tuner for each of the N satellites, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each of the N satellites, wherein, if when a connection state of each of a
third satellite of the N satellites and a fourth satellite of the N satellites is loop-through, the processor determines whether the first tuner and the second tuner can be independently tuned at the same time and, if when the first tuner and the second tuner can be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

26. (Currently Amended) The digital broadcast receiver of claim 25, wherein, if when the first tuner and the second tuner can not be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as a single tuner.
REMARKS/ARGUMENTS

Claims 1, 2, 4-16 and 18-26 are pending. By this Amendment, the drawings, the specification, and claims 1, 2, 4-16 and 18-26 are amended, and claims 3 and 17 are canceled without prejudice or disclaimer. No new matter is added. Support for the claims can be found throughout the specification, including the original claims and the drawings. Reconsideration in view of the above amendment and following remarks is respectfully requested.

The Examiner is thanked for the indication that claims 3-13 and 17-26 would be allowable if rewritten in independent form including all of the features of the respective base claim and any intervening claims. The allowable features of claims 3 and 17 have been added to independent claims 1 and 14, respectively, and claims 3 and 17 have been canceled. Accordingly, independent claims 1 and 14, along with claims 2, 4-6, 15 and 16, which depend respectively therefrom, should be in condition for allowance. Further, each of claims 7 and 18-25 has been rewritten in independent form. Accordingly, independent claims 7 and 18-25, along with claims 8-13 and 26, which depend respectively therefrom, should be in condition for allowance. It is further submitted that, as all of pending claims 1, 2, 4-16 and 18-26 are in condition for allowance, the application should now be in condition for allowance.

The Office Action rejected claims 1, 2 and 14-16 under 35 U.S.C. §102(e) over Coffin III, U.S. Patent Publication No. 2005/0124289. The rejection is moot in view of the amendments discussed above.
CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned, Joanna K. Mason, at the telephone number listed below.

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, 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

Carol L. Druzbick
Registration No. 40,287
Joanna K. Mason
Registration No. 56,408

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
(703) 766-3777  CLDJKM/sec/gs/ph

Date: March 25, 2011

Please direct all correspondence to Customer Number 34610
Start

Tune first tuner and second tuner to same TP information

Extract SI information from TP information inputted through first tuner

Tune first tuner to TP information of other satellite

Extract SI information from TP information inputted through second tuner

1030
Are the SI information identical to each other?

No

1040
Write as single tuner

Yes

1035
Write as dual different

End
# Electronic Patent Application Fee Transmittal

<table>
<thead>
<tr>
<th>Application Number:</th>
<th>12094376</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filing Date:</td>
<td>20-May-2008</td>
</tr>
<tr>
<td>Title of Invention:</td>
<td>Method and Device for Setting Connection Type of Dual Tuner</td>
</tr>
<tr>
<td>First Named Inventor/Applicant Name:</td>
<td>Jun-Hyung Kim</td>
</tr>
<tr>
<td>Filer:</td>
<td>Joanna K. Mason/Lisa Dyer</td>
</tr>
<tr>
<td>Attorney Docket Number:</td>
<td>EZ-0007</td>
</tr>
<tr>
<td>Filed as Large Entity</td>
<td></td>
</tr>
</tbody>
</table>

## U.S. National Stage under 35 USC 371 Filing Fees

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee Code</th>
<th>Quantity</th>
<th>Amount</th>
<th>Sub-Total in USD($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Filing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pages:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claims:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent claims in excess of 3</td>
<td>1614</td>
<td>8</td>
<td>220</td>
<td>1760</td>
</tr>
<tr>
<td>Miscellaneous-Filing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petition:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent-Appeals-and-Interference:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Allowance-and-Post-Issuance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension-of-Time:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Fee Code</td>
<td>Quantity</td>
<td>Amount</td>
<td>Sub-Total in USD($)</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total in USD ($) 1760</td>
</tr>
</tbody>
</table>
**Electronic Acknowledgement Receipt**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFS ID:</td>
<td>9739501</td>
</tr>
<tr>
<td>Application Number:</td>
<td>12094376</td>
</tr>
<tr>
<td>International Application Number:</td>
<td></td>
</tr>
<tr>
<td>Confirmation Number:</td>
<td>1823</td>
</tr>
<tr>
<td>Title of Invention:</td>
<td>Method and Device for Setting Connection Type of Dual Tuner</td>
</tr>
<tr>
<td>First Named Inventor/Applicant Name</td>
<td>Jun-Hyung Kim</td>
</tr>
<tr>
<td>Customer Number:</td>
<td>34610</td>
</tr>
<tr>
<td>Filer:</td>
<td>Joanna K. Mason/Lisa Dyer</td>
</tr>
<tr>
<td>Filer Authorized By:</td>
<td>Joanna K. Mason</td>
</tr>
<tr>
<td>Attorney Docket Number:</td>
<td>EZ-0007</td>
</tr>
<tr>
<td>Receipt Date:</td>
<td>25-MAR-2011</td>
</tr>
<tr>
<td>Filing Date:</td>
<td>20-MAY-2008</td>
</tr>
<tr>
<td>Time Stamp:</td>
<td>13:16:08</td>
</tr>
<tr>
<td>Application Type:</td>
<td>U.S. National Stage under 35 USC 371</td>
</tr>
</tbody>
</table>

**Payment information:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted with Payment</td>
<td>yes</td>
</tr>
<tr>
<td>Payment Type</td>
<td>Credit Card</td>
</tr>
<tr>
<td>Payment was successfully received in RAM</td>
<td>$1760</td>
</tr>
<tr>
<td>RAM confirmation Number</td>
<td>12155</td>
</tr>
<tr>
<td>Deposit Account</td>
<td></td>
</tr>
<tr>
<td>Authorized User</td>
<td></td>
</tr>
</tbody>
</table>

**File Listing:**

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Document Description</th>
<th>File Name</th>
<th>File Size(Bytes)/Message Digest</th>
<th>Multi Part / .zip</th>
<th>Pages (if appl.)</th>
</tr>
</thead>
</table>


### Document Description/PDF files in.zip description

<table>
<thead>
<tr>
<th>Description</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmittal Letter</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Amendment/Req. Reconsideration-After Non-Final Reject</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Drawings-only black and white line drawings</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Specification</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Claims</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Applicant Arguments/Remarks Made in an Amendment</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Drawings-only black and white line drawings</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

**Warnings:**

**Information:**

| 2 | Fee Worksheet (PTO-875) | fee-info.pdf | 29948 | no | 2 |

**Warnings:**

**Information:**

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

**New Applications Under 35 U.S.C. 111**

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

**National Stage of an International Application under 35 U.S.C. 371**

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

**New International Application Filed with the USPTO as a Receiving Office**

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

In re Application of

Jun-Hyung KIM; Ho YI and Min-Haeng CHO

Confirmation No.: 1823

Group Art Unit: 2618

Examiner: Tan H. TRINH

Serial No: 12/094,376

Filed: May 20, 2008

Customer No.: 34610

For: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

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.

☒ Also attached: Extra Claims Fee

The fee has been calculated as shown below:

<table>
<thead>
<tr>
<th>NO. OF CLAIMS</th>
<th>HIGHEST PREVIOUSLY PAID FOR</th>
<th>EXTRA CLAIMS</th>
<th>RATE</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Claims</td>
<td>24</td>
<td>26</td>
<td>0</td>
<td>$0.00</td>
</tr>
<tr>
<td>Independent Claims</td>
<td>11</td>
<td>3</td>
<td>8</td>
<td>$1760.00</td>
</tr>
</tbody>
</table>

If multiple claims newly presented, add $390.00 to TOTAL FEE DUE

☐ Please charge my Deposit Account No. 16-0607 in the amount of $______. An additional copy of this transmittal sheet is submitted herewith.

☒ Please charge my Credit Card.

☒ 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

Carol L. Druzdick
Registration No. 40,287
Joanna K. Mason
Registration No. 56,408

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
(703) 766-3777
Date: March 25, 2011

Please direct all correspondence to Customer Number 34610

Q:\Documents\2309-067\273029
**PATENT APPLICATION FEE DETERMINATION RECORD**

**APPLICATION AS FILED – PART I**

<table>
<thead>
<tr>
<th>FOR</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASIC FEE</strong> (37 CFR 1.16(a), (b), or (c))</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>SEARCH FEE</strong> (37 CFR 1.16(b), (i), or (m))</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>EXAMINATION FEE</strong> (37 CFR 1.16(i), (g), or (q))</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL CLAIMS</strong> (37 CFR 1.16(j))</td>
<td>minus 20 = *</td>
</tr>
<tr>
<td><strong>INDEPENDENT CLAIMS</strong> (37 CFR 1.16(i))</td>
<td>minus 3 = *</td>
</tr>
<tr>
<td><strong>APPLICATION SIZE FEE</strong> (37 CFR 1.16(e))</td>
<td>If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</td>
</tr>
<tr>
<td><strong>MULTIPLE DEPENDENT CLAIM PRESENT</strong> (37 CFR 1.16(j))</td>
<td></td>
</tr>
</tbody>
</table>

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

**APPLICATION AS AMENDED – PART II**

<table>
<thead>
<tr>
<th>AMENDMENT DATE</th>
<th>AMENDMENT</th>
<th>CLAIMS REMAINING AFTER AMENDMENT</th>
<th>HIGHEST NUMBER PREVIOUSLY PAID FOR</th>
<th>PRESENT EXTRA</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/25/2011</td>
<td>Total</td>
<td>- 24 Minus ** 26 ** 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Independent</td>
<td>- 11 Minus ** 3 ** 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Application Size Fee</strong> (37 CFR 1.16(e))</td>
<td>If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AMENDMENT**

<table>
<thead>
<tr>
<th>CLAIMS REMAINING AFTER AMENDMENT</th>
<th>HIGHEST NUMBER PREVIOUSLY PAID FOR</th>
<th>PRESENT EXTRA</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (37 CFR 1.16(a))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent (37 CFR 1.16(i))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Application Size Fee</strong> (37 CFR 1.16(e))</td>
<td>If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AMENDMENT**

<table>
<thead>
<tr>
<th>CLAIMS REMAINING AFTER AMENDMENT</th>
<th>HIGHEST NUMBER PREVIOUSLY PAID FOR</th>
<th>PRESENT EXTRA</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (37 CFR 1.16(a))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent (37 CFR 1.16(i))</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 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: /BRENDA HARRISON/
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. 12/094,376
Applicant(s) KIM ET AL.
Examiner TAN TRINH
Art Unit 2618

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 20 May 2006.
2a) □ This action is FINAL.
2b) ☑ This action is non-final.
3) □ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☑ Claim(s) 1-26 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, 2 and 14-16 is/are rejected.
7) ☑ Claim(s) 3, 13 and 17-26 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 20 May 2006 is/are: a) ☑ accepted or b) □ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) □ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☑ All    b) □ Some * c) □ None of:
   1. ☑ Certified copies of the priority documents have been received.
   2. □ Certified copies of the priority documents have been received in Application No. ______.
   3. □ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)
2) □ Notice of Draftsman’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

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 05-20-2008, the information disclosure statement has been considered by the examiner.

Claim Rejections - 35 USC § 102

2. 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 –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.


Regarding claim 1, Coffin teaches a method of setting a tuner (212) connection state of n satellites (202 and 204) (fig. 2-3, page 3, par [0032]), n being a natural number, the satellites (202 and 204) being connected to one or more antennas (206) (fig. 2-3, page 2, par [0032-0033]), the method executed in a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by
using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]).

Regarding claim 2, Coffin teaches each of the respective satellites (202 and 204) comprises information on one antenna (206) (fig. 2), and the antenna (206) information comprises a combination of at least one or more items of low noise block down converter information, 22 KHz tone information, satellite information (202 and 204 and Identified 208 and 210) and digital satellite equipment (216) control information (fig. 2-3, see LNB, or LNBF, page 3, par [0032-0035]).

Regarding claim 14, Coffin teaches a digital broadcast receiver (216) (fig. 2), comprising: a plurality of tuners (400 and 402) (fig. 4, page 1, par [0007]), receiving from each antenna (206) a satellite signal (208 and 210) transmitted from a satellite (202 and 204) (fig. 2); a demodulator (428 or 420), demodulating the satellite signal (208 and 210) (fig. 2 and 4, page 4, par [0043 and 0044]); a demultiplexer, classifying the demodulated (decoded) satellite signal (208 and 210) in accordance with data type and outputting the classified data (page 4, par [0043-0045]); a decoder, decoding each of the data classified by the demultiplexer (page 4, par [0043-0045]); and a processor (404), setting a tuner (212) connection state corresponding to N satellites (202 and 204) (fig. 2-3, page 3, par [0032]), N being a natural number (202 and 204), by use of the satellite signal (208 and 210) inputted through the tuner (212) (fig. 2-3, page 3, par [0032]); whereas the processor (404) sets a connection state of the tuner (212, 400 and 402 of 216) for each satellite (202 and 204) (fig. 2, page 1, par [0007] and page 3, par [0039]), each satellite (202
and 204) having information for one satellite (page 2, par [0023-0024]), and then sets a tuner
(212, 400 and 402 of 216) connection state between the satellites (202 and 204) by using the
connection state set for each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]).

Regarding claim 15, Coffin teaches digital broadcast receiver (216) further comprising a
memory (406, 408, 410 and 412) storing the set tuner connection state between the satellites (202
and 204) (fig. 2 and 4-5, page 1, par [0007] and page 3-4, par [0037-0041]).

Regarding claim 16, Coffin teaches the processor tunes each of a first tuner (400) and a
second tuner (402) by using a fifth satellite signal (208 or 210) received through a satellite (202
and 204), and if any one of the first tuner and the second tuner is not tuned, the processor sets the
tuner connection of the satellite as a single tuner (216) (fig. 2 and 4, page 3-4, par [0032-0041]).

Allowable Subject Matter

4. Claims 3-13 and 17-26 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.

Reasons for allowance

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

Regarding dependent claim 3, Coffin teaches a digital broadcast receiver (216) comprising a
plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212)
connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the step of setting the tuner connection state for each satellite comprises: determining whether each of a first tuner and a second tuner is tuned, by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite; if each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; tuning any one of the first tuner and the second tuner to a second satellite signal having polarization properties different from the first satellite signal if it is determined that the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; and setting the connection state of the satellite as dual same if the first tuner and the second tuner are tuned by the first satellite signal and the second satellite signal, respectively, as specified in dependent claim 3.
Regarding dependent claim 7, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the step of setting the tuner connection state between the satellites by using a connection state set for each satellite comprises: tuning each of the first tuner and the second tuner to the third satellite signal; extracting program specification information (PSI) or service information (SI) from the third satellite signal inputted through the first tuner; tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal; extracting second PSI or SI from the third satellite signal inputted through the second tuner; determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI; and setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI, as specified in dependent claim 7.

Regarding dependent claim 17, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received
from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212)
connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]),
between the satellites (202 and 204) by using a connection state set for each satellite (202 and
204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4,
page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of
record, fail to disclose if each of the first tuner and the second tuner is tuned to the fifth satellite
signal, the processor extracts program specification information (PSI) or service information (SI)
from each of the first tuner and the second tuner and determines whether the PSI or SI extracted
from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the
fifth satellite signal inputted through the second tuner are identical to each other, and if it is
determined that the PSI or SI extracted from the fifth satellite signal inputted through the first
tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner
are identical to each other, tunes any one of the first tuner and the second tuner to a sixth satellite
signal, the sixth satellite signal being a signal for a satellite that is different from the satellite of
the fifth satellite signal, and then, if each of the first tuner and the second tuner is tuned by the
fifth satellite signal and the sixth satellite signal, respectively, sets the tuner connection state of
the satellite as dual same, as specified in dependent claim 17.

Regarding dependent claim 20, Coffin teaches a digital broadcast receiver (216)
comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the
tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received
from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212)
connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]),
between the satellites (202 and 204) by using a connection state set for each satellite (202 and
204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4,
page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of
record, fail to disclose the digital broadcast receiver of claim 14, wherein, if the connection state
of each of a third satellite and a fourth satellite is a first single tuner, the processor sets a tuner
connection state between the third satellite and the fourth satellite as a first single tuner, and if
the connection state of each of the third satellite and the fourth satellite is a second single tuner,
the processor sets the tuner connection state between the third satellite and the fourth satellite as
a second single tuner, as specified in dependent claim 20.

Regarding dependent claim 21, Coffin teaches a digital broadcast receiver (216)
comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the
tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received
from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212)
connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]),
between the satellites (202 and 204) by using a connection state set for each satellite (202 and
204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4,
page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of
record, fail to disclose the digital broadcast receiver of claim 14, wherein, if a connection state of
a third satellite is any one of a first single tuner and a second single tuner, and a connection state
of a fourth satellite is the other, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different, as specified in dependent claim 21.

Regarding dependent claim 22, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the digital broadcast receiver of claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner, a second single tuner and loop-through, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different, as specified in dependent claim 22.

Regarding dependent claim 23, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]),
between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the digital broadcast receiver of claim 14, wherein, if a connection state of a third satellite is dual same, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different, as specified in dependent claim 23.

Regarding dependent claim 24, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the digital broadcast receiver of claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner and a second single tuner, and a connection state of a fourth satellite is loop-through, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different, as specified in dependent claim 24.
Regarding dependent claim 25, Coffin teaches a digital broadcast receiver (216) comprising a plurality of tuners (fig. 4, page 1, par [0007]), the method comprising: setting the tuner (212) connection state for each satellite (202 and 204) by using a satellite signal received from each satellite (202 and 204) (fig. 2-3, page 3, par [0032]); and setting the tuner (212) connection state of the tuners (400 and 402 of 216) (page 1, par [0007] and page 3, par [0039]), between the satellites (202 and 204) by using a connection state set for each satellite (202 and 204) and the satellite signal received (208 and 210) from each satellite (202 and 204) (fig. 2-4, page 3, par [0032-0034]). However, Coffin alone or in combination with other prior art of record, fail to disclose the digital broadcast receiver of claim 14, wherein, if a connection state of each of a third satellite and a fourth satellite is loop-through, the processor determines whether the first tuner and the second tuner can be independently tuned at the same time and, if the first tuner and the second tuner can be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different, as specified in dependent claim 25.

**Conclusion**

6. Any response to this action should be mailed to:

   Commissioner of Patents and Trademarks
   Washington, D.C. 20231

or faxed to:

(571) 273-8300, (for Technology Center 2600 only)

Hand-delivered responses should be brought to the Customer Service Window (now located at the Randolph Building, 401 Dulany Street, Alexandria, VA 22314).
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tan Trinh whose telephone number is (571) 272-7888. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor, Anderson, Matthew D., can be reached at (571) 272-4177.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

8. 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.

Tan H. Trinh
Division 2618
December 17, 2010

/TAN TRINH/
Primary Examiner, Art Unit 2618
**U.S. PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>*</th>
<th>Document Number</th>
<th>Date MM-YYYY</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US-2005/0124289</td>
<td>06-2005</td>
<td>Coffin, Louis F. III</td>
<td>455/003.02</td>
</tr>
<tr>
<td>B</td>
<td>US-2006/0277578</td>
<td>12-2006</td>
<td>Goldblatt et al.</td>
<td>725/068</td>
</tr>
<tr>
<td>D</td>
<td>US-2006/0271966</td>
<td>11-2006</td>
<td>Staal et al.</td>
<td>725/068</td>
</tr>
<tr>
<td>G</td>
<td>US-2002/0038458</td>
<td>03-2002</td>
<td>Staal et al.</td>
<td>725/78</td>
</tr>
<tr>
<td>H</td>
<td>US-2005/0193419</td>
<td>09-2005</td>
<td>Lindstrom et al.</td>
<td>725/071</td>
</tr>
<tr>
<td>I</td>
<td>US-2005/0055729</td>
<td>03-2005</td>
<td>Atad et al.</td>
<td>725/118</td>
</tr>
</tbody>
</table>

**FOREIGN PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>*</th>
<th>Document Number</th>
<th>Date MM-YYYY</th>
<th>Country</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
</table>

| N | O | P | Q | R | S | T |

**NON-PATENT DOCUMENTS**

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

| * | U | V | W | X |

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

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)
# Index of Claims

<table>
<thead>
<tr>
<th>Claim</th>
<th>Final</th>
<th>Original</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>12/17/2010</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>O</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Search Notes

**12094376**

<table>
<thead>
<tr>
<th>Application/Control No.</th>
<th>Applicant(s)/Patent Under Reexamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>12094376</td>
<td>KIM ET AL.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examiner</th>
<th>Art Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAN TRINH</td>
<td>2618</td>
</tr>
</tbody>
</table>

### SEARCHED

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>455</td>
<td>3.01, 3.02, 3.03, 3.04, 12.1, 67.13, 132, 67.11, 179.1, 103, 137, 228.1, 67.1,</td>
<td>12-17-2010</td>
<td>TT</td>
</tr>
<tr>
<td>370</td>
<td>401, 312,</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>725</td>
<td>70, 68, 63, 78, 80, 44, 39, 71, 100, 131, 151, 118, 105, 148</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
<tr>
<td>EAST</td>
<td>see print out</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
</tbody>
</table>

### SEARCH NOTES

<table>
<thead>
<tr>
<th>Search Notes</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAST</td>
<td>12-17-10</td>
<td>TT</td>
</tr>
</tbody>
</table>

### INTERFERENCE SEARCH

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Date</th>
<th>Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**BIB DATA SHEET**

**CONFIRMATION NO. 1823**

<table>
<thead>
<tr>
<th>SERIAL NUMBER</th>
<th>FILING or 371(c) DATE</th>
<th>CLASS</th>
<th>GROUP ART UNIT</th>
<th>ATTORNEY DOCKET NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/094,376</td>
<td>05/20/2008</td>
<td>455</td>
<td>2618</td>
<td>EZ-0007</td>
</tr>
</tbody>
</table>

**APPLICANTS**
- Jun-Hyung Kim, Gyeonggi-do, KOREA, REPUBLIC OF;
- Ho Yi, Gyeonggi-do, KOREA, REPUBLIC OF;
- Min-Haeng Cho, Gyeonggi-do, KOREA, REPUBLIC OF;

**CONTINUING DATA ****************************
This application is a 371 of PCT/KR2006/005037 11/28/2006

**FOREIGN APPLICATIONS ********************
- REPUBLIC OF KOREA 10-2006-0112126 11/14/2006

**IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
07/29/2008

<table>
<thead>
<tr>
<th>Foreign Priority claimed</th>
<th>Yes</th>
<th>No</th>
<th>STATE OR COUNTRY</th>
<th>SHEETS DRAWINGS</th>
<th>TOTAL CLAIMS</th>
<th>INDEPENDENT CLAIMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS USC 119(a-d) conditions met</td>
<td>Yes</td>
<td>No</td>
<td>KOREA, REPUBLIC OF</td>
<td>10</td>
<td>26</td>
<td>2</td>
</tr>
</tbody>
</table>

**ADDRESS**
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195
UNITED STATES

**TITLE**
Method and Device for Setting Connection Type of Dual Tuner

**FILING FEE RECEIVED**
1230

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)
- [ ] Other ______________
- [ ] Credit

BIB (Rev. 05/07).
<table>
<thead>
<tr>
<th>Ref #</th>
<th>Hits</th>
<th>Search Query</th>
<th>DBs</th>
<th>Default Operator</th>
<th>Plurals</th>
<th>Time Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>1</td>
<td>&quot;20080276288&quot;.pn.</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 11:24</td>
</tr>
<tr>
<td>L2</td>
<td>1</td>
<td>&quot;6272312&quot;.pn.</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 11:33</td>
</tr>
<tr>
<td>L3</td>
<td>75</td>
<td>(direct adj TV) and tuner</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 11:44</td>
</tr>
<tr>
<td>L4</td>
<td>25</td>
<td>3 and (satellite adj receiver)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 11:44</td>
</tr>
<tr>
<td>L5</td>
<td>8388</td>
<td>((digital adj broadcast adj receiver) DBR DBS) and ((plurality adj tuner) (multiple adj tuner) tuners)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:22</td>
</tr>
<tr>
<td>L6</td>
<td>617</td>
<td>5 and (satellite adj signal)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:23</td>
</tr>
<tr>
<td>L7</td>
<td>25</td>
<td>6 and (connection adj state)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:24</td>
</tr>
<tr>
<td>L8</td>
<td>0</td>
<td>6 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:30</td>
</tr>
<tr>
<td>L9</td>
<td>0</td>
<td>6 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:30</td>
</tr>
<tr>
<td>L10</td>
<td>0</td>
<td>5 and (independent adj tune)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:30</td>
</tr>
<tr>
<td>-----</td>
<td>---</td>
<td>----------------------------</td>
<td>---------------------------</td>
<td>----</td>
<td>----</td>
<td>------------------</td>
</tr>
<tr>
<td>L11</td>
<td>3025</td>
<td>5 and independent</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:31</td>
</tr>
<tr>
<td>L12</td>
<td>362</td>
<td>11 and (satellite adj signal)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:31</td>
</tr>
<tr>
<td>L13</td>
<td>23</td>
<td>12 and (connection adj state)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:31</td>
</tr>
<tr>
<td>L14</td>
<td>221</td>
<td>6 and ((set adj top adj box) STB)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:33</td>
</tr>
<tr>
<td>L15</td>
<td>47</td>
<td>14 and IRD</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:33</td>
</tr>
<tr>
<td>L16</td>
<td>7</td>
<td>15 and ((low adj noise adj amplifier) LNA)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:57</td>
</tr>
<tr>
<td>L17</td>
<td>37</td>
<td>15 and (low adj noise adj block)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:58</td>
</tr>
<tr>
<td>L18</td>
<td>11</td>
<td>17 and (down adj converter)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:58</td>
</tr>
<tr>
<td>L19</td>
<td>0</td>
<td>18 and (22KHz adj tone)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:58</td>
</tr>
<tr>
<td>L20</td>
<td>0</td>
<td>15 and (22KHz adj tone)</td>
<td>US-PGPUB; USPAT; EPO; JPO</td>
<td>OR</td>
<td>ON</td>
<td>2010/12/17 12:59</td>
</tr>
</tbody>
</table>
EAST Search History (Interference)

<This search history is empty>

12/17/10 1:03:55 PM
C:\Documents and Settings\ttrinh1\My Documents\EAST\Workspaces\2009.wsp
**LIST OF ART CITED BY APPLICANT**  
(PTO-1449)

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>*PATENT NO.</th>
<th>*ISSUE DATE</th>
<th>*INVENTOR NAME</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>FILING DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,272,312 B1</td>
<td>08/07/2001</td>
<td>Takayama et al.</td>
<td>455</td>
<td>3.02</td>
<td>01/08/1999</td>
</tr>
</tbody>
</table>

**U.S. PATENT APPLICATION PUBLICATIONS**

<table>
<thead>
<tr>
<th>*PATENT APPLN. PUB. NO.</th>
<th>*PUB. DATE</th>
<th>*APPLICANT</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

**U.S. PATENT APPLICATIONS**

<table>
<thead>
<tr>
<th>*APPLN. NO.</th>
<th>*FILING DATE</th>
<th>*INVENTOR</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

**FOREIGN PATENT DOCUMENTS**

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>PATENT NO.</th>
<th>DATE</th>
<th>COUNTRY</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WO 03/085851 A1</td>
<td>10/16/2003</td>
<td>WIPO (English Abstract and Japanese Full Text)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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


**EXAMINER** /Tan Trinh/  
**DATE CONSIDERED** 12/17/2010

---

**ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /TT/**
### U.S. Patent Documents

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Issue Date</th>
<th>Inventor Name</th>
<th>Class</th>
<th>Subclass</th>
<th>Filing Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,272,312 B1</td>
<td>08/07/2001</td>
<td>Takayama et al.</td>
<td>455</td>
<td>3.02</td>
<td>01/08/1999</td>
</tr>
</tbody>
</table>

### U.S. Patent Application Publications

|------------------------|-----------|-----------|-------|----------|

### U.S. Patent Applications

<table>
<thead>
<tr>
<th>Appln. No.</th>
<th>Filing Date</th>
<th>Inventor</th>
</tr>
</thead>
</table>

### Foreign Patent Documents

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Date</th>
<th>Country</th>
<th>Class</th>
<th>Subclass</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO 03/085851 A1</td>
<td>10/16/2003</td>
<td>WIPO (English Abstract and Japanese Full Text)</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

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


---

Exam: 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.

All references considered except where lined through. /TT/
Title: Method and Device for Setting Connection Type of Dual Tuner
Publication Date: 11/06/2008

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 publically 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.
NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/20/2008</td>
<td>DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS</td>
</tr>
<tr>
<td>05/20/2008</td>
<td>DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS</td>
</tr>
</tbody>
</table>

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE ApPEARING ON THE FILING RECEIPT AS THE "FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363). Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Copy of the International Application filed on 05/20/2008
- Copy of the International Search Report filed on 05/20/2008
- Preliminary Amendments filed on 05/20/2008
- Information Disclosure Statements filed on 05/20/2008
- Oath or Declaration filed on 05/20/2008
- Request for Immediate Examination filed on 05/20/2008
- U.S. Basic National Fees filed on 05/20/2008
- Priority Documents filed on 05/20/2008
- Specification filed on 05/20/2008
- Claims filed on 05/20/2008
- Abstracts filed on 05/20/2008
- Drawings filed on 05/20/2008
Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

DIAN S GORDON

Telephone: (703) 308-9290 EXT 125
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 submit a written request for a Filing Receipt Correction. 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)

Jun-Hyung Kim, Gyeonggi-do, KOREA, REPUBLIC OF;
Ho Yi, Gyeonggi-do, KOREA, REPUBLIC OF;
Min-Haeng Cho, Gyeonggi-do, KOREA, REPUBLIC OF;

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

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/KR2006/005037 11/28/2006

Foreign Applications

REPUBLIC OF KOREA 10-2005-0114502 11/29/2005
REPUBLIC OF KOREA 10-2006-0112126 11/14/2006

If Required, Foreign Filing License Granted: 07/29/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 12/094,376

Projected Publication Date: 11/06/2008

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 application(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).
**TRANSMITTAL LETTER TO THE UNITED STATES DESIGNED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**

<table>
<thead>
<tr>
<th>INTERNATIONAL APPLICATION NO.</th>
<th>INTERNATIONAL FILING DATE</th>
<th>PRIORITY DATE CLAIMED</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT/KR2006/005037</td>
<td>November 28, 2006</td>
<td>November 29, 2005</td>
</tr>
</tbody>
</table>

**ATTORNEY’S DOCKET NUMBER**

| EZ-0007 |

**U.S. APPLICATION NO. (If known, see 37 CFR 1.5)**

**TITLE OF INVENTION**

**METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER**

**APPLICANT(S) FOR DO/EO/US**

Jun-Hyung KIM; Ho YI and Min-Hacng CHO

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☑ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☑ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected (Article 31).
5. ☑ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☑ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☑ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☑ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☑ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under Article 19 (35 U.S.C. 371(c)(3)).
9. ☑ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☑ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(e)(5)).

**Items 11 to 20 below concern document(s) or information included:**

13. ☑ A Preliminary Amendment.
16. ☐ A Power of Attorney and/or change of address letter.
17. ☒ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821-1.825.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. 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 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering information, preparing, and submitting the completed 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: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
The following fees have been submitted:

21. ☒ Basic national fee (37 CFR 1.492(a)) .............................................. \$310.00
22. ☒ Examination fee (37 CFR 1.492(c)) .................................................. \$210.00

If the written opinion prepared by IDS/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provision of PCT Article 33(1)-(4) ................. \$0
All other situations ................................................................. \$210.00

23. ☒ Search fee (37 CFR 1.492(b)) ............................................................ \$410.00

If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provision of PCT Article 33(1)-(4) ................. \$0
Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority ......................................................... \$100.00
International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB ........................................ \$410.00
All other situations ................................................................. \$510.00

TOTAL OF 21, 22, and 23 = \$930.00

Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) or computer program listing in an electronic medium) (37 CFR 1.492(jj)).
The fee is \$260.00 for each additional 50 sheets of paper or fraction thereof.

<table>
<thead>
<tr>
<th>Total Sheets</th>
<th>Extra Sheets</th>
<th>Number of each additional 50 or fraction thereof (round up to a whole number)</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>/50 = $260.00</td>
<td></td>
</tr>
</tbody>
</table>

Surcharge of \$130.00 for furnishing any of the search fee, examination fee, or the oath or declaration later than 30 months after the date of commencement of the national stage (37 CFR 1.492(h)).

<table>
<thead>
<tr>
<th>CLAIMS</th>
<th>NUMBER FILED</th>
<th>NUMBER EXTRA</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Claims</td>
<td>26 - 20</td>
<td>6</td>
<td>$50.00</td>
</tr>
<tr>
<td>Independent Claims</td>
<td>2 - 3</td>
<td>0</td>
<td>$210.00</td>
</tr>
<tr>
<td>MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td>
<td>+ $370.00</td>
<td>$0.00</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL OF ABOVE CALCULATIONS = \$1,230.00

Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.
SUBTOTAL = \$615.00

Processing fee of \$130.00 for furnishing the English language translation later than 30 months from the earliest priority date (37 CFR 1.492(f))
TOTAL NATIONAL FEE = \$1,230.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40.00 per property
TOTAL FEES ENCLOSED = \$1,230.00

Amount to be refunded: $0.00
Amount to be charged: \$1,230.00
<table>
<thead>
<tr>
<th>U.S. APPLICATION (If known, see 37 CFR 1.5)</th>
<th>INTERNATIONAL APPLICATION</th>
<th>ATTORNEY’S DOCKET NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCT/KR2006/005037</td>
<td>EZ-0007</td>
</tr>
</tbody>
</table>

- a. □ A check in the amount of $___________ to cover the above fees is enclosed.
- b. □ Please charge my Deposit Account No. ___________ in the amount of $__________ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-0607. A duplicate copy of this sheet is enclosed.
- d. ☒ Fees are to be charged to a credit card. WARNING: Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

**ADVISORY:** If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your credit card information may be displayed via **PAIR**. To protect your information, it is recommended paying fees online by using the electronic payment method.

**NOTE:** Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

CUSTOMER NO. 34610

KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, Virginia 22151-1200
USA

[Signature]

Daniel Y.J. Kim

NAME

36,186

REGISTRATION NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNED/ELECTED OFFICE (DO/OE/US) CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO. PCT/KR2006/005037
INTERNATIONAL FILING DATE November 28, 2006
PRIORITY DATE CLAIMED November 29, 2005

TITLE OF INVENTION
METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

APPLICANT(S) FOR DO/OE/US
Jun-Hyung KIM; Ho YI and Min-Hacng CHO

Applicant hereby submits to the United States Designated/Elected Office (DO/OE/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. □ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. □ The US has been elected (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. □ has been communicated by the International Bureau.
   c. □ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto.
   b. □ has been previously submitted under 35 U.S.C. 154(d)(4).
7. □ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. □ are attached hereto (required only if not communicated by the International Bureau).
   b. □ have been communicated by the International Bureau.
   c. □ have not been made; however, the time limit for making such amendments has NOT expired.
   d. □ have not been made and will not be made.
8. □ An English language translation of the amendments to the claims under Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

13. ☒ A Preliminary Amendment.
16. □ A Power of Attorney and/or change of address letter.
17. □ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821-1.825.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. 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 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering information, preparing, and submitting the completed 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: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Page 1 of 3
The following fees have been submitted:

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic national fee (37 CFR 1.492(a))</td>
<td>$310.00</td>
</tr>
<tr>
<td>Examination fee (37 CFR 1.492(c))</td>
<td>$210.00</td>
</tr>
<tr>
<td>Search fee (37 CFR 1.492(b))</td>
<td>$410.00</td>
</tr>
<tr>
<td>Total of 21, 22, and 23</td>
<td>$930.00</td>
</tr>
</tbody>
</table>

Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) or computer program listing in an electronic medium) (37 CFR 1.492(jj)). The fee is $260.00 for each additional 50 sheets of paper or fraction thereof.

<table>
<thead>
<tr>
<th>Total Sheets</th>
<th>Extr Sheets</th>
<th>Number of each additional 50 or fraction thereof (round up to a whole number)</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/50</td>
<td></td>
<td>$260.00</td>
</tr>
</tbody>
</table>

Surcharge of $130.00 for furnishing any of the search fee, examination fee, or the oath or declaration later than 30 months after the date of commencement of the national stage (37 CFR 1.492(h)).

<table>
<thead>
<tr>
<th>CLAIMS</th>
<th>NUMBER FILED</th>
<th>NUMBER EXTRA</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Claims</td>
<td>26 - 20</td>
<td>6</td>
<td>x $50.00</td>
</tr>
<tr>
<td>Independent Claims</td>
<td>2 - 3 =</td>
<td>0</td>
<td>x $210.00</td>
</tr>
</tbody>
</table>

MUTLIPLE DEPENDENT CLAIM(S) (if applicable) + $370.00 $0.00

TOTAL OF ABOVE CALCULATIONS = $1,230.00

Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.

SUBTOTAL = $0.00

Processing fee of $130.00 for furnishing the English language translation later than 30 months from the earliest priority date (37 CFR 1.492(f)).

TOTAL NATIONAL FEE = $1,230.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) $40.00 per property.

TOTAL FEES ENCLOSED = $1,230.00
A check in the amount of $___________ to cover the above fees is enclosed.

Please charge my Deposit Account No. ___________ in the amount of $___________ to cover the above fees.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-0607. A duplicate copy of this sheet is enclosed.

Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

**ADVISORY:** If filing by EFS-Web, do NOT attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is not recommended and by doing so your credit card information may be displayed via PAIR. To protect your information, it is recommended paying fees online by using the electronic payment method.

**NOTE:** Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

**SEND ALL CORRESPONDENCE TO:**

**CUSTOMER NO. 34610**

**KED & ASSOCIATES, LLP**

**P.O. Box 221200**

**Chantilly, Virginia 22151-1200**

**USA**

**SIGNATURE**

[Signature]

**NAME**

Daniel Y.J. Kim

**REGISTRATION NUMBER**

36,186
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Jun-Hyung KIM; Ho YI and Min-Haeng CHO

Serial No.: National Stage Application of International Application No. PCT/KR2006/005037

International Filing Date: November 28, 2006
U.S. National Stage Filing Date: May 20, 2008

For: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

PRELIMINARY AMENDMENT

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

Sir:

Prior to initial examination on the merits, please amend the above-identified application as follows:

Amendments to the Specification are reflected in this paper.

Remarks/Arguments begin after the listing of the claims.
AMENDMENTS TO THE SPECIFICATION

Please add the following new paragraph before the Technical Field:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of PCT application PCT/KR2006/005037 filed on November 28, 2006, which is hereby incorporated by reference, which claims priority under 35 U.S.C. §119 to Korean Application Nos. 10-2005-0114502 filed on November 25, 2005 and 10-2006-0112126 filed on November 14, 2006, whose entire disclosures are hereby incorporated by reference.
Claims 1-26 are pending in this application. By this Amendment, the specification has been amended. Prompt examination and allowance in due course are respectfully solicited.

CONCLUSION

Should the Examiner have any questions regarding the above-identified application, the Examiner is invited to contact the undersigned attorney, Daniel Y.J. Kim, at the telephone number listed below.

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, 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/

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

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

Date: May 20, 2008
Please direct all correspondence to Customer Number 34610

\\Files\Documents\2309\2209-007\159797.doc
METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

Abstract: The present invention relates to a connection state setting method of a dual tuner and an apparatus. In accordance with an embodiment of the present invention, the method of setting a tuner connection state of n satellites in a digital broadcast receiver having the plurality of tuners, n being a natural number, that are connected to one or more antennas includes setting the tuner connection state for each satellite by using a satellite signal inputted from each satellite, which has information on one antenna, and setting the tuner connection state between the satellites by using a connection state set for each satellite and the satellite signal inputted from each satellite. Accordingly, with the present invention, the digital broadcast receiver having two tuners can automatically set the connection state of satellite lines of each tuner.
[DESCRIPTION]

【Invention Title】

METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

【Technical Field】

The present invention relates to a digital broadcast receiver, more specifically to a method and an apparatus for setting a connection state between N satellites in a digital broadcast receiver employing two tuners.

【Background Art】

A digital broadcast receiver, such as a digital TV and a set top box (STB), has been widely used recently. As illustrated in FIG. 1, this typical digital broadcast receiver functions as the set top box that performs personal video recoding (PVR), which writes and stores a digital broadcast program in large capacity writing means such as a hard disk drive (HDD). Also, the digital broadcast receiver is connected to a satellite broadcast antenna 20 and a television 40.

The satellite broadcast antenna 20, for receiving a digital satellite broadcast re-broadcasted through a plurality of satellites, receives and outputs to a digital broadcast receiver 30 a digital satellite broadcast re-broadcasted by a transponder. The
transponder receives an electric wave transmitted from a broadcast station on the

ground and amplifies and re-transmits to the ground the received electric wave.

Provided in the center of the satellite broadcast antenna 20 is a low noise block
down converter (LNB), which converts a frequency of 4 to 12GHz to frequency of

1Ghz.

The digital broadcast receiver 30 restores and processes the original video and
audio signals of a digital broadcast program of MPEG2 transport stream, received
through the satellite broadcast antenna 20. Then, the digital broadcast receiver 30
outputs and displays the video and audio signals through a television 40 such that a user
can watch a desired digital broadcast program.

The digital broadcast receiver 30 can employ two tuners to allow the user to
record a channel while watching another channel. The tuner tunes satellite signals
inputted through the LNB to a signal of a particular preset frequency.

However, a conventional digital broadcast receiver 30 is restricted to use the
two tuners in accordance with the number of LNBs that receive satellite signals.

For example, when polarization, high band and low band are selected in one
LNB, if a particular frequency (e.g. horizontal polarization and high band) is received
only, all tuners tune to a specific frequency within one satellite signal.

Owing to this restriction, the digital broadcast receiver 30 requires a user to set
a loop-through mode or a separate mode through a user menu. In the loop-through mode,
two tuners share an LNB signal provided through one signal line. In the separate mode, each tuner independently tunes a different LNB signal provided through two signal lines.

In case that LNB signals received through the two signal lines are the same, the digital broadcast receiver 30, which has set the connection mode of the satellite signal for two tuners, makes the two tuners search for a channel or copy a channel, searched from one tuner, to the other tuner.

However, it is not easy for a general user who uses the digital broadcast receiver employing two tuners to understand the restriction. If the user wrongly sets the two tuners as the loop-through mode or separate mode, the two tuners can not function properly.

【Disclosure】
【Technical Problem】

The present invention, to solve the problem of the above-described conventional art, provides a method and an apparatus for setting a connection state of a dual tuner that can allow a satellite line connection state of each tuner to be automatically set in the digital broadcast receiver employing two tuners.

The present invention also provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user's convenience by automatically
setting a satellite signal line connection state of each tuner, which is complicated to set.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can reduce the possibility of erroneously setting the tuner, which has been frequently generated, due to having the same transponder (TP) information for different satellites in case that a digital satellite equipment control (DiSEqC) switch is used.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can set a connection state of each tuner as any one of a single type, a loop-through type, a dual same type and a dual different type.

Furthermore, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user’s convenience by setting a tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recoding or watching.

【Technical Solution】

An aspect of the present invention features a method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners.
According to an embodiment of the present invention, a method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners includes the steps of setting the tuner connection state for each satellite by using a satellite signal received from each satellite, and setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

The step of setting the tuner connection state for each satellite includes the steps of determining whether each of a first tuner and a second tuner is tuned, by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite; if each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; tuning any one of the first tuner and the second tuner to a second satellite signal having polarization properties different from the first satellite signal if it is determined that the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; and setting the connection state of the
satellite as dual same if the first tuner and the second tuner are tuned by the first satellite signal and the second satellite signal, respectively.

The step of setting the tuner connection state between the satellites by using a connection state set for each satellite includes the steps of tuning each of the first tuner and the second tuner to the third satellite signal, extracting program specification information (PSI) or service information (SI) from the third satellite signal inputted through the first tuner, tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal, extracting second PSI or SI from the third satellite signal inputted through the second tuner, determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI and setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

Another aspect of the present invention features a digital broadcast receiver of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas.

According to an embodiment of the present invention, a digital broadcast receiver includes a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite; a demodulator, demodulating the satellite signal; a demultiplexcr, classifying the demodulated satellite signal in accordance with data type
and outputting the classified data; a decoder, decoding each of the data classified by the
demultiplexer; and a processor, setting a tuner connection state corresponding to N
satellites, N being a natural number, by use of the satellite signal inputted through the
tuner, whereas the processor sets a connection state of the tuner for each satellite, each
satellite having information for one satellite, and then sets a tuner connection state
between the satellites by using the connection state set for each satellite.

【Advantageous Effects】

By providing a method and an apparatus for setting a connection state of a dual
tuner in accordance with the present invention, a satellite line connection state of each
tuner can be automatically set in the digital broadcast receiver employing two tuners.

With the present invention, a user’s convenience can be improved by
automatically setting a satellite line connection state of each tuner, which is complicated
to set. With the present invention, the possibility of erroneously setting the tuner, which
has been frequently generated, can be reduced by having the same TP information for
different satellites in case that a digital satellite equipment control (DiSEqC) switch is
used.

With the present invention, a connection state of each tuner can be set as any
one of a single type, a loop-through type, a dual same type and a dual different type.

With the present invention, a user’s convenience can be improved by setting a
tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recoding or watching.

5  **[Description of Drawings]**

    FIG. 1 illustrates a connection state of a general digital broadcast receiver;

    FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention;

    FIG. 3 and FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite;

    FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver;

    FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention;

    FIG. 7 illustrates a flow chart illustrating a method of setting a connection state of each tuner for M satellites searched by a digital broadcast receiver;

    FIG. 8 is a state table for setting a connection state of setting M antennas in accordance with an embodiment of the present invention;

20  FIG. 9 is a flow chart illustrating a method of setting a connection state of
setting M antennas in accordance with an embodiment of the present invention; and

FIG. 10 is a flow chart illustrating a method of setting a connection state between satellites in accordance with an embodiment of the present invention.

5 【Mode for Invention】

Since there can be a variety of permutations and embodiments of the present invention, certain embodiments will be illustrated and described with reference to the accompanying drawings. This, however, is by no means to restrict the present invention to certain embodiments, and shall be construed as including all permutations, equivalents and substitutes covered by the spirit and scope of the present invention.

Throughout the drawings, similar elements are given similar reference numerals.

Hereinafter, the embodiments will be described with reference to the accompanying drawings, examples of which are illustrated in the accompanying drawings, wherein like reference numbers refer to like elements throughout. Throughout the description of the present invention, when describing a certain technology is determined to evade the point of the present invention, the pertinent detailed description will be omitted.

FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention, and FIG. 3 and
FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite. FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver.

Referring to FIG.2, a digital broadcast receiver 200 in accordance with the present invention comprises two tuners 210a and 210b, a demodulator 215, a demultiplexer 220, a decoder 225, a data output unit 230, a memory 235 and a processor 240. FIG. 2 illustrates the digital broadcast receiver 200 employing two tuners only. However, it shall be evident that the digital broadcast receiver 200 in accordance with the present invention can have two or more tuners. Similarly, FIG. 2 illustrates that the digital broadcast receiver 200 includes one demultiplexer 220 and one decoder 225. However, the digital broadcast receiver 200 in accordance with the present invention can have the same numbers of the demultiplexer 220 and the decoder 225, respectively, as the number of the provided tuners 210 in accordance with a method of embodying the digital broadcast receiver 200.

The demodulator 215, by the control of the processor 240, demodulates and transfers to the demultiplexer 220 a signal (i.e. an electrical signal) inputted through the tuners 210a and 210b.

The demultiplexer 220 parses an audio signal, a video signal and data, demodulated and inputted by the demodulator 215, and divides the audio signal, the video signal and the data in accordance with each data type to output the respective
divided signals to the decoder 225. In the drawing, one decoder 225 is illustrated. It is
evident, however, that the decoder 225 can be realized as a video decoder, an audio
decoder and a data decoder in accordance with the function of the decoder 225. The data
type can be video data, audio data and/or information data.

The decoder 225 decodes the original audio, video and data signals (hereinafter,
referred to as "information data" for the convenience of understanding and description)
by decoding the respective data, divided and inputted by the demultiplexer 220 by the
control of the processor 240, in accordance with a predetermined method. Also, the
decoder 225, by the control of the processor 240, outputs through the output unit 230 or
stores in the memory 235 the respective data. FIG. 2 illustrates that one decoder 225
decodes the video, audio and information data. However, it is shall be evident that an
individual decoder (e.g. a video decoder, an audio decoder and an information decoder)
can be provided to decode each kind of data.

The memory 235 can include a volatile memory and a non-volatile memory.

The video data, the audio data and the information data, decoded by the decoder 225,
are written in the memory 235 by the control of the processor 240. The memory 235
also stores an algorithm to operate the digital broadcast receiver 200 in accordance with
the present invention.

The data output unit 230, by the control of the processor 240, outputs the video
and/or audio data stored in the memory 235 or outputs the information data by the
on-screen display (OSD) method. The OSD indicates a screen of a display apparatus (e.g. a monitor or a television), coupled to the data output unit 230, on which desired information is self-displayed without the input of an additional video signal. Of course, the data output unit 230 can output the respective data, decoded by the decoder 225, to the display apparatus by the control of the processor 240.

The processor 240 controls internal elements of the digital broadcast receiver 200 in accordance with the present invention (e.g. the tuners 210a and 210b, the demodulator 215, the demultiplexer 220, the decoder 225, the data output unit 230 and memory 235).

Also, the processor 240 can set a connection state between each satellite and a tuner 210a or 210b corresponding to each satellite. This will be described below with reference to the related drawings.

In the digital broadcast receiver, the connection type of the satellite signal line can be classified in accordance with the number of signal lines. For example, in case that one signal line is provided, as illustrated in FIG. 3, only one signal is connected to the satellite signal line at a time by connecting a digital satellite equipment control (DiSEqC) switch (not shown) in accordance with the number of the LNB. As illustrated in FIG. 4, in case that two signal lines are provided, the same satellite signals or different satellite signals are connected to two DiSEqC switches. The DiSEqC switch automatically selects a plurality of satellite antennas with one satellite receiver. One
receiver can typically receive signals from 4 antennas or polarized signals from up to 8 antennas.

First, a connection mode in accordance with a physical connection of satellite signal lines to each tuner will be briefly described for the convenience of understanding and the description. Hereinafter, the connection mode will be described based on the case of two tuners.

As illustrated in (a) of FIG. 5, a case in which any one (e.g. a first tuner 210a) of the two tuners 210a and 210b is connected to the satellite signal line is referred to as a "single tuner." That is, the single tuner represents a mode in which any one of the two tuners is only used. For the convenience, the mode in which only the first tuner 210a (refer to FIG. 2) is connected to the satellite signal line is referred to as a "first single tuner." Another mode in which only a second tuner 220b (refer to FIG. 2) is connected to the satellite signal line is referred to as a "second single tuner."

As illustrated in (b) of FIG. 5, a connection mode in which the two tuners 210a and 210b are connected to one satellite signal line, and the same satellite signal is inputted to the first tuner 210a and the second tuner 210b, is referred to as a "loop-through." That is, in the loop-through connection mode, an output part of the first tuner 210a and an input part of the second tuner 210b are connected. Accordingly, as illustrated in (b) of FIG. 5, a satellite signal received through the antenna can be inputted via an input part of the first tuner 210a and tuned. Then, the same satellite
signal outputted through the output part of the first tuner 210a can be inputted via the
input part of the second tuner 220b and tuned. Here, the same satellite signal means a
signal of the same polarization properties inputted from the same satellite. A satellite
can send a satellite signal of vertically polarized wave properties and another satellite
signal of horizontally polarized wave properties. In case of the loop-through, since one
satellite signal line is connected to the antenna, the tuners 210a and 210b, respectively,
can be tuned by the satellite signals of the same polarization properties.

As illustrated in (c) of FIG. 5, two satellite signal lines are connected to the
tuners 210a and 210b. The satellite signal lines connected to the tuners 210a and 210b
are connected to one or more antennas. The tuners 210a and 210b can receive a satellite
signal from the same satellite. This connection mode is referred to as a "dual same." In
case of the dual same, since a satellite signal line is connected to each of the tuners 210a
and 210b through the respective LNB, the tuners 210a and 210b can receive from the
same satellite and tune to the respective satellite signal. For example, the first tuner
210a can receive and tune to a first satellite signal corresponding to the vertically
polarized wave. The second tuner 210b can receive and tune to a second satellite signal
corresponding to the horizontally polarized wave. In addition, as illustrated in (c) of FIG.
5, since the satellite signal lines connected to the respective tuners are coupled to one
antenna, the first tuner 210a and the second tuner 210b, respectively, can receive signals
of different polarization properties from the same satellite and be tuned.
As illustrated in (d) of FIG. 5, a connection mode in which each of the tuners 210a and 210b is connected to each satellite signal line through its own corresponding antenna is referred to as a “dual different.” For example, in case of the dual different, since the input parts of the first and second tuners 210a and 210b are connected to the respective signal lines, the first and second tuners 210a and 210b can be independently tuned. Further, in case of the dual different, unlike the dual same, the satellite signal lines, each of which is connected to the first tuner 210a and the second tuner 210b, respectively, are connected to different satellites. The two tuners 210a and 210b are independently tuned by the different satellite signals.

FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention. It is hereinafter assumed that the digital broadcast receiver 200 employs two tuners 210a and 210b and the processor 240 sets and stores in the memory 235 an antenna connection state for M searched satellites, M being a natural number larger than zero. As such, when the connection state for the M searched satellites is stored, if the connection state for a satellite is required to be re-checked (e.g. a connection state in accordance with the change of antenna information through a menu of the channel search for a concerned satellite or the satellite state diagnosis is requested to be re-checked (or re-set)), the processor 240 can receive the satellite signal from a
transponder corresponding to the concerned satellite and set the connection state for each of the tuners 210a and 210b.

In a step represented by 610, the processor 240 determines whether the first tuner 210a and the second tuner 210b, respectively, are tuned by using each satellite signal of different polarization properties that is received from a transponder corresponding to the present satellite K.

For example, the first tuner 210a can try to be tuned to the first satellite signal received from the transponder. The second tuner 210b can try to be tuned to the second satellite signal having different polarization properties. The first and second satellite signals can be received through the same satellite or different satellites.

If the first tuner 210a and the second tuner 210b are tuned by the respective TP information of different polarization properties, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the separate in a step represented by 615.

However, if the first tuner 210a and the second tuner 210b are not tuned by the respective TP information, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the loop-through in a step represented by 620.

If the connection state of the first and second tuners 210a and 210b for the present satellite K is set in steps represented by 610 through 620, the processor 240 sets
the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N. A method of setting the connection state is described below.

To set the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the IP information received from the present satellite K (hereinafter, referred to as “first TP information” for the convenience of understanding and description) and the TP information received from the searched satellite N (hereinafter, referred to as “second TP information” for the convenience of understanding and description) and determines whether both the first tuner 210a and the second tuner 210b are tuned, in a step represented by 625.

For example, in case that the present satellite K and the searched satellite N employ the same antenna by using the same switch, the first tuner 210a and the second tuner 210b cannot be independently tuned at the same time.

Accordingly, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the first TP information and the second TP information received from each respective satellite. As a result of tuning them, if the first and second tuners 210a and 210b are independently tuned, the processor 240 determines that the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N is the separate. If the first tuner 210a and the second tuner 210b,
respectively, are independently tuned, in a step represented by 630, the processor 240 writes in the memory 255 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the separate.

If the first tuner 210a and the second tuner 210b, respectively, are not independently tuned, in a step represented by 635, the processor 240 writes in the memory 255 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the loop-through.

Here, the processor 240 can set a connection state of each of the tuners 210a and 210b between the present satellite K and respective searched satellites by repeating the steps represented by 625 through 635 M times.

FIG. 7 illustrates a flow chart illustrating a method of setting a connection state of each tuner for M satellites searched by a digital broadcast receiver, and FIG. 8 is a state table for setting a connection state of setting M antennas in accordance with an embodiment of the present invention. The method of checking a connection state of the satellite signal line of each of the tuners 210a and 210b by automatically tuning without separate software setting will be described below in detail. It is assumed that the digital broadcast receiver 200 employs two tuners 210a and 210b. Also, the method of setting a connection state of each tuner 210a or 210b of the satellites and of between the satellites in a state that M satellites, M being a natural number, are searched will be hereinafter
described. Here, since the method of searching M satellites and the method of setting antenna information for each satellite are well-known to those of ordinary skill in the art, the related description will be omitted.

Typically, a digital satellite broadcast signal is relayed through a transponder. The satellite broadcast antenna receives and transfers to the digital broadcast receiver 200 the digital satellite broadcast signal. The digital satellite broadcast signal received through each antenna is referred to as “TP information” or a “satellite signal” for the convenience of understanding and description. The TP information or the satellite signal can be information in a transport stream unit. Also, the method of setting a connection state of each tuner 210a or 210b of the satellites and of between the satellites, corresponding to the set antenna information in a state that the satellite signal line connected to each antenna is physically coupled to each tuner 210a or 210b, will be described in detail.

Although the below description relates to the method of setting each antenna and connection state of the tuners 210a and 210b between the antenna settings for the setting of M antennas, the method of setting the connection state of M satellites and between the satellites will be described for the convenience of understanding and description.

If M satellites are searched through a plurality of antennas as illustrated in FIG. 8, the connection state of each tuner 210a or 210b of each satellite and between the
satellites is set by checking the connection state \( M \times M \) times.

Briefly describing FIG. 8, "A" represents each component, in which the two tuners 210a and 210b are tuned by using each of the TP information having different polarization properties received from each satellite (i.e. each of the TP information having different polarization properties received from one satellite). "B" and "C" represent components, in which the tuners 210a and 210b are tuned by using TP information received from different satellites. That is, B and C set the connection state between the satellites by using the connection state set by A. Since B and C are symmetrical with each other, and thus the connection state for any one component of B and C is required to be set and used, it is assumed that the connection state for one component is set.

Referring to FIG. 7, if M satellites are searched in a step represented by 710, first, the connection state of each satellite having corresponding antenna information is set. For example, referring to FIG. 8, a diagonal group 810 sets the connection state of each satellite having concerned antenna information. Accordingly, the tuner connection state of each satellite \( x \), \( x \) being a natural number, can be checked by tuning the first tuner 210a and the second tuner 210b with a satellite signal transmitted from the satellite \( x \).

For example, assuming that the first tuner 210a is tuned to the first satellite signal but the second tuner 210b is not tuned, the processor 240 can set the tuner
connection of the satellite x as the first single tuner. This is described below in detail with reference to FIG. 9.

Once the whole tuner connection state of the respective M satellites is set, the processor 240 sets, in a step represented by 620, the connection state of the tuners 210a and 210b of each satellite (e.g. the first satellite and the second satellite) having different antenna information by using the connection state by the step represented by 610. This is described below in detail with reference to FIG. 10.

For example, referring to FIG. 8, since all connection states of each tuner 210a or 210b of the respective satellite x are set, the connection state of the tuners 210a and 210b of each satellite (i.e. the first satellite and the second satellite) having different antenna settings can be set by using the connection state of the satellite x.

Referring to FIG. 8, since a first area 820 and a second area 830 correspond to each other, the whole connection state can be set by setting the tuner connection state of each satellite for any one of the first area 820 and the second area 830.

FIG. 9 is a flow chart illustrating a method of setting a connection state of setting M antennas in accordance with an embodiment of the present invention. The method of setting the connection state of each satellite x, x being a natural number larger than zero, of the diagonal group 810 will be described with reference to FIG. 8. That is, the method of setting the tuner connection state for the component A will be
hereinafter described. Further, the method of setting each tuner connection state after receiving at least one item of TP information (i.e. satellite signal) having different polarization properties from at least one transponder corresponding to a satellite x will be described.

Although the below description relates to the method of setting the connection state for respective N antenna settings, the method of setting the connection state of N satellites will be described for the convenience of understanding and description.

Referring to FIG. 9, in a step represented by 910, the processor 240 determines whether the first tuner 210a and the second tuner 210b can be tuned by tuning each of the first tuner 210a and the second tuner 210b by use of the same satellite signal (hereinafter, commonly referred to as TP information).

If neither the first tuner 210a nor the second tuner 210b is tuned by using the same TP information, the processor 240 recognizes and writes in the memory 235 the connection state of the satellite x as the single tuner, using any one of the first tuner 210a and the second tuner 210b, in a step represented by 915.

However, if both the first tuner 210a and the second tuner 210b are tuned by using the same TP information, the processor 240 extracts program specification information (PSI) or service information (SI) from a satellite signal inputted from the first tuner 210a and the second tuner 210b, respectively, in a step represented by 920.

Then, the processor 240 compares the extracted PSI or SI information with each other in
a step represented by 925.

For example, let us assume that the PSI or the SI extracted through the first tuner 210a is referred to as a “first PSI” or a “first SI”, and the PSI or the SI extracted through the second tuner 210b is referred to as a “second PSI” or a “second SI.” If it is determined that each of the abstracted PSI or SI is identical to each other, the processor 240 can recognize the connection state as at least the loop-through. If it is determined that each of the abstracted PSI or SI is different from each other, the processor 240 can recognize that the TP information tuned by the first tuner 210a and the second tuner 210b is not transmitted from the same satellite. That is, the processor 240 can recognize that the concerned TP information overlaps in at least two satellites. The PSI or the SI is included in the digital video broadcasting (DVB) standard in accordance with the digital satellite broadcast, and the PSI is included in the MPEG-2 standard. Since the method of extracting the PSI or the SI from the inputted TP information is well-known to any person of ordinary skill in the art, the redundant description will be omitted.

If it is determined that each of the PSI or SI is not identical to each other, the processor 240 returns to the step represented by 915 and writes the connection state of the respective satellite x in the memory 235.

If it is determined that each of the PSI or SI is identical to each other, the processor 240 determines, in a step represented by 930, whether both the first tuner 210a and the second tuner 210b are tuned by tuning any one of the first tuner 210a and
the second tuner 210b having the TP information of different polarization properties.

For example, a state in which the first tuner 210a and the second tuner 210b, respectively, are tuned by using TP information of vertically polarized wave (hereinafter, referred to as "first TP information") is assumed. In the state, the processor 240 tunes the first tuner 210a by using TP information of horizontally polarized wave (hereinafter, referred to as "second TP information") and then determines whether the first tuner 210 and the second tuner 210b are tuned.

As a result, if the first tuner 210a is tuned only and the TP information is not inputted, the processor 240 recognizes and sets the connection state of the pertinent satellite x as at least the loop-through, in a step represented by 935.

If both the first tuner 210a and the second tuner 210b are tuned, that is, the first tuner 210a and the second tuner 210b, respectively, are tuned by using the TP information of different polarized wave, the processor 240 recognizes and sets the connection state of the concerned satellite x as at least the dual same in a step represented by 940.

The processor 240 can set the tuner connection state of the respective M satellites by repeating the steps represented by 910 through 940.

FIG. 10 is a flow chart illustrating a method of setting a connection state of each satellite in accordance with the present invention. Assuming that all connection
states of each satellite \( x \) of the diagonal group 810 are checked by first setting a connection state of \( M \) antennas in FIG. 9, the method of checking the connection state of each satellite of the first area 820 in FIG. 8 by use of the connection state of the concerned satellite \( x \) will be described below. That is, Since B and C are symmetrical with each other, the connection state of each satellite for any one of B and C will be described.

Although the below description relates to the method of setting the connection state for setting each of the \( M \) antenna, the method of setting the connection state of \( M \) satellites will be described for the convenience of understanding and description.

Further, the method of setting the connection state of each satellite after receiving the TP information corresponding to each satellite from the transponders corresponding to the two satellites will be described below.

The processor 240 first sets the connection state between the satellites logically and evidently deduced from the connection state of each satellite having the same antenna information, which is not illustrated in FIG. 10.

For example, if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the first single tuner, the processor 240 sets the connection states of the first and second satellites as the first single tuner. If the first satellite and the second satellite, respectively, are the second single tuner, the processor 240 can set the connection states of the first satellite and the second satellite
as the second single tuner.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the other, since the first satellite and the second satellite each can independently tune satellite signals that are physically different, the processor 240 sets the connection states of the first satellite and the second satellite as the dual different.

Also, if the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

Of course, if the connection state of the first satellite is the dual same, and the connection state of the second satellite is any one of the first and second single tuners, the processor 240 can similarly set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.
If the connection state of the first satellite and the second satellite, respectively, is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual same.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the loop-through, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is any one of the first and second single tuners, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the loop-through, one of the two cases are possible. In one case, the first satellite and the second satellite can independently perform tuning at the same time. In the other case, the first satellite and the second satellite cannot independently perform tuning at the same time. Accordingly, in such a
case, the connection state between the satellites may be checked and set through the following method. This method will be described in detail with reference to FIG. 10.

Referring to FIG. 10, the processor 240 tries, in a step represented by 1010, to tune the first tuner 210a and the second tuner 210b by using the same TP information (hereinafter, referred to as "third TP information"). For example, the processor 240 tunes the first tuner 210a by use of the third TP information before tuning the second tuner 210b by use of the third TP information.

In a step represented by 1015, the processor 240 obtains PSI or SI from the third TP information inputted through the first tuner 210a. Since the method of obtaining the PSI or SI is well-known to any person of ordinary skill in the art, the pertinent description will be omitted. For the convenience, the PSI or SI obtained from a satellite signal inputted through the first tuner 210a tuned with the third TP information will be referred to as third PSI information or third SI information.

In a step represented by 1020, the processor 240 tunes the first tuner 210a by using TP information (referred to as "fourth TP information", for the purpose of convenience) that is transmitted from a different satellite and is different from the third TP information.

In this state, if the third TP information tuned to the second tuner 210b is disconnected, the connection state of between two satellites can be recognized as at least the loop-through. The third TP information tuned to the second tuner 210b is not
inputted, it can be inferred that the physical connection mode of the tuners 210a and 210b is the single tuner or the loop-through.

In a step represented by 1025, the control unit extracts PSI or SI (referred to as "fourth PSI or fourth SI" for the purpose of convenience) from a satellite signal inputted through the second tuner 210b tuned with the third TP information.

The processor 240 determines whether the third PSI or the third SI is identical to the fourth PSI or the fourth SI in a step represented by 1030.

As a result, if it is determined that the third PSI or the third SI is identical to the fourth PSI or the fourth SI, the processor 240 writes, in a step represented by 1035, in the memory 235 that the connection state between two satellites is the dual different.

Since that the third PSI or the third SI is identical to the fourth PSI or the fourth SI means that the second tuner 210b is not disconnected, this also means that the first satellite and the second satellite can independently perform tuning at the same time.

If it is determined that the third PSI or the third SI is not identical to the fourth PSI or the fourth SI, the processor 240 writes in the memory 235 that the connection state between two satellites is the single tuner, in a step represented by 1040. Of course, the connection state between the two satellites can be the loop-through. However, since the respective two satellites cannot independently tune, the connection state can be configured to be the single tuner, for the purpose of convenience.

The processor 240 checks and sets the connection state of every satellite by
repeating the steps represented by 1010 through 1040.

【Industrial Applicability】

Hitherto, although some embodiments of the present invention have been
shown and described for the above-described objects, it will be appreciated by any
person of ordinary skill in the art that a large number of modifications, permutations and
additions are possible within the principles and spirit of the invention, the scope of
which shall be defined by the appended claims and their equivalents.
【CLAIMS】

【Claim 1】

A method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, the method executed in a digital broadcast receiver comprising a plurality of tuners, the method comprising:

setting the tuner connection state for each satellite by using a satellite signal received from each satellite; and

setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

【Claim 2】

The method of Claim 1, wherein each of the respective satellites comprises information on one antenna, and

the antenna information comprises a combination of at least one or more items of low noise block down converter information, 22KHz tone information, satellite information and digital satellite equipment control information.

【Claim 3】

The method of Claim 1, wherein the step of setting the tuner connection state for each satellite comprises:
determining whether each of a first tuner and a second tuner is tuned, by tuning
each of the first tuner and the second tuner to a first satellite signal received from a
satellite;

if each of the first tuner and the second tuner is tuned, extracting program
specification information (PSI) or service information (SI) from the first satellite signal
inputted through the first tuner and the second tuner, respectively, and determining
whether the PSI or SI extracted from the first satellite signal inputted through the first
tuner and the PSI or SI extracted from the first satellite signal inputted through the
second tuner are identical to each other;

tuning any one of the first tuner and the second tuner to a second satellite signal
having polarization properties different from the first satellite signal if it is determined
that the PSI or SI extracted from the first satellite signal inputted through the first tuner
and the PSI or SI extracted from the first satellite signal inputted through the second
tuner are identical to each other; and

setting the connection state of the satellite as dual same if the first tuner and the
second tuner are tuned by the first satellite signal and the second satellite signal,
respectively.

【Claim 4】

The method of Claim 3, further comprising a step of setting the connection state
of the satellite as single tuner if any one of the first tuner and the second tuner is not
tuned to a second satellite signal.

【Claim 5】

5  The method of Claim 3, further comprising a step of setting the connection state
of the satellite as single tuner if the PSI or SI extracted from the first satellite signal
inputted through the first tuner and the PSI or SI extracted from the first satellite signal
inputted through the second tuner are not identical to each other.

【Claim 6】

10  The method of Claim 3, further comprising a step of setting the connection state
of the satellite as loop-through if any one of the first tuner and the second tuner is tuned,
and then the other tuner is disconnected.

【Claim 7】

15  The method of Claim 1, wherein the step of setting the tuner connection state
between the satellites by using a connection state set for each satellite comprises:
tuning each of the first tuner and the second tuner to the third satellite signal;
extracting program specification information (PSI) or service information (SI)
from the third satellite signal inputted through the first tuner;
tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal;

extracting second PSI or SI from the third satellite signal inputted through the second tuner;

determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI; and

setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

【Claim 8】

The method of Claim 7, further comprising a step of setting the connection state between the satellites as the single tuner if the extracted first PSI or SI is not identical to the extracted second PSI or SI.

【Claim 9】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as a first single tuner if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the first single tuner.
【Claim 10】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as dual different if the connection state of the first satellite is the loop-through, and the connection state of the second satellite is dual same.

【Claim 11】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual same if the connection state of the first satellite is the dual same, and the connection state of the second satellite is the dual same.

【Claim 12】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual different if the connection state of the first satellite is any one of the first single tuner and the second single tuner, and the connection state of the second satellite is the dual same.

【Claim 13】

The method of Claim 7, further comprising a step of setting the connection state
between a first satellite and a second satellite as the dual different if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the second single tuner.

【Claim 14】
A digital broadcast receiver, comprising:

- a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite;
- a demodulator, demodulating the satellite signal;
- a demultiplexer, classifying the demodulated satellite signal in accordance with data type and outputting the classified data;
- a decoder, decoding each of the data classified by the demultiplexer; and
- a processor, setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner,

whereas the processor sets a connection state of the tuner for each satellite, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each satellite.

【Claim 15】
The digital broadcast receiver of Claim 14, further comprising a memory
storing the set tuner connection state between the satellites.

【Claim 16】

The digital broadcast receiver of Claim 14, wherein the processor tunes each of a first tuner and a second tuner by using a fifth satellite signal received through a satellite, and if any one of the first tuner and the second tuner is not tuned, the processor sets the tuner connection of the satellite as a single tuner.

【Claim 17】

The digital broadcast receiver of Claim 14, wherein if each of the first tuner and the second tuner is tuned to the fifth satellite signal, the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, and if it is determined that the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, tunes any one of the first tuner and the second tuner to a sixth satellite signal, the sixth satellite signal being a signal for a satellite that is different from the satellite of the fifth satellite signal, and then, if each of
the first tuner and the second tuner is tuned by the fifth satellite signal and the sixth satellite signal, respectively, sets the tuner connection state of the satellite as dual same.

【Claim 18】

The digital broadcast receiver of Claim 17, wherein the processor tunes any one of the first tuner and the second tuner to the sixth satellite signal and then sets the tuner connection state of the satellite as loop-through if any one of the first tuner and the second tuner is not tuned.

【Claim 19】

The digital broadcast receiver of Claim 17, wherein the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, and, if it is determined that the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, sets the tuner connection state of the satellite as single tuner.

【Claim 20】

The digital broadcast receiver of Claim 14, wherein, if the connection state of
each of a third satellite and a fourth satellite is a first single tuner, the processor sets a tuner connection state between the third satellite and the fourth satellite as a first single tuner, and

if the connection state of each of the third satellite and the fourth satellite is a second single tuner, the processor sets the tuner connection state between the third satellite and the fourth satellite as a second single tuner.

【Claim 21】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner and a second single tuner, and a connection state of a fourth satellite is the other, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 22】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner, a second single tuner and loop-through, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 23】
The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is dual same, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 24】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner and a second single tuner, and a connection state of a fourth satellite is loop-through, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 25】

The digital broadcast receiver of Claim 14, wherein, if a connection state of each of a third satellite and a fourth satellite is loop-through, the processor determines whether the first tuner and the second tuner can be independently tuned at the same time and, if the first tuner and the second tuner can be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 26】
The digital broadcast receiver of Claim 25, wherein, if the first tuner and the second tuner can not be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as a single tuner.
Start

Can each tuner be independently tuned?

Yes

Write tuner connection state of present satellite as separate

615

No

Write tuner connection state of present satellite as loop-through

620

Can each tuner be independently tuned by TP information provided from different satellite?

Yes

Write tuner connection state between satellites as separate

630

No

Write tuner connection state between satellites as loop-through

635

End
Start

Set tuner connection state of each satellite 710

Set tuner connection state between the satellites by using tuner connection state of each satellite 720

End
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>\cdots</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>820</td>
</tr>
<tr>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
</tr>
<tr>
<td>\text{N}</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>810</td>
</tr>
</tbody>
</table>

830
Start

910
Can both first tuner and second tuner be tuned with use of same TP information?

Yes 920
Extract SI information from TP information inputted from each of first tuner and second tuner

No 915
Write as single tuner

925
Are the SI information identical to each other?

Yes 930
Is first tuner tuned by using TP information having different polarization properties?

No 935
Write as loop-through

Yes 940
Write as dual same

End
Start

1. Tune first tune and second tune to same TP information

2. Extract SI information from TP information inputted through first tuner

3. Tune first tune to TP information of other satellite

4. Extract SI information from TP information inputted through second tuner

5. Are the SI information identical to each other?
   - No: Write as single tuner
   - Yes: Write as dual different

End
A. **CLASSIFICATION OF SUBJECT MATTER**

*H04N 5/50(2006.01)*

According to International Patent Classification (IPC) or to both national classification and IPC.

B. **FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Electronic database consulted during the international search (name of database and, where practical, search terms used)

eKIPASS Search Term: tuner, satellite

C. **DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WO 3085581 A (SONY CORP.) 16 October 2003 See abstract and page 1, line 6-page 7, line 2.</td>
<td>1-26</td>
</tr>
<tr>
<td>A</td>
<td>US 6272312 A (AKIRA TAKAYAMA ET AL.) 7 August 2001 See abstract and column 1, line 13-column 3, line 10.</td>
<td>1-26</td>
</tr>
</tbody>
</table>

☐ Further documents are listed in the continuation of Box C.  ☒ See patent family annex.

* Special categories of cited documents:
  * "A" document defining the general state of the art which is not considered to be of particular relevance
  * "E" earlier application or patent but published on or after the international filing date
  * "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
  * "O" document referring to an oral disclosure, use, exhibition or other means
  * "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search: 22 FEBRUARY 2007 (22.02.2007)

Date of mailing of the international search report: 23 FEBRUARY 2007 (23.02.2007)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
920 Duman-dong, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

PARK, Jia Woo

Telephone No. 82-42-481-5765

Form PCT/ISA/210 (second sheet) (April 2005)
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO03065651A1</td>
<td>16.10.2003</td>
<td>CN1656697A</td>
<td>17.08.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPO1494362A1</td>
<td>05.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP1494362A1</td>
<td>05.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP15304162</td>
<td>24.10.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP15324359</td>
<td>14.11.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2003304162A2</td>
<td>24.10.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2003324359A2</td>
<td>14.11.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR1020040106326</td>
<td>17.12.2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW226155B</td>
<td>01.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US2005122426AA</td>
<td>09.06.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO2003065651A1</td>
<td>16.10.2003</td>
</tr>
<tr>
<td>US06272312</td>
<td>07.06.2001</td>
<td>DE69617314C0</td>
<td>25.09.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP899146B1</td>
<td>20.08.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP11205172A2</td>
<td>30.07.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP11205172</td>
<td>30.07.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR1019990067799</td>
<td>25.06.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW410508B</td>
<td>01.11.2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW410508A</td>
<td>01.11.2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US8272312BA</td>
<td>07.06.2001</td>
</tr>
</tbody>
</table>
METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

The present invention relates to a digital broadcast receiver, more specifically to a method and an apparatus for setting a connection state between N satellites in a digital broadcast receiver employing two tuners.

A digital broadcast receiver, such as a digital TV and a set top box (STB), has been widely used recently. As illustrated in FIG. 1, this typical digital broadcast receiver functions as the set top box that performs personal video recording (PVR), which writes and stores a digital broadcast program in large capacity writing means such as a hard disk drive (HDD). Also, the digital broadcast receiver is connected to a satellite broadcast antenna 20 and a television 40.

The satellite broadcast antenna 20, for receiving a digital satellite broadcast re-broadcasted through a plurality of satellites, receives and outputs to a digital broadcast receiver 30 a digital satellite broadcast re-broadcasted by a transponder. The
transponder receives an electric wave transmitted from a broadcast station on the
ground and amplifies and re-transmits to the ground the received electric wave.

Provided in the center of the satellite broadcast antenna 20 is a low noise block
down converter (LNB), which converts a frequency of 4 to 12GHz to frequency of

1GHz.

The digital broadcast receiver 30 restores and processes the original video and
audio signals of a digital broadcast program of MPEG2 transport stream, received
through the satellite broadcast antenna 20. Then, the digital broadcast receiver 30
outputs and displays the video and audio signals through a television 40 such that a user
can watch a desired digital broadcast program.

The digital broadcast receiver 30 can employ two tuners to allow the user to
record a channel while watching another channel. The tuner tunes satellite signals
inputted through the LNB to a signal of a particular preset frequency.

However, a conventional digital broadcast receiver 30 is restricted to use the
two tuners in accordance with the number of LNBs that receive satellite signals.

For example, when polarization, high band and low band are selected in one
LNB, if a particular frequency (e.g. horizontal polarization and high band) is received
only, all tuners tune to a specific frequency within one satellite signal.

Owing to this restriction, the digital broadcast receiver 30 requires a user to set
a loop-through mode or a separate mode through a user menu. In the loop-through mode,
two tuners share an LNB signal provided through one signal line. In the separate mode, each tuner independently tunes a different LNB signal provided through two signal lines.

In case that LNB signals received through the two signal lines are the same, the digital broadcast receiver 30, which has set the connection mode of the satellite signal for two tuners, makes the two tuners search for a channel or copy a channel, searched from one tuner, to the other tuner.

However, it is not easy for a general user who uses the digital broadcast receiver employing two tuners to understand the restriction. If the user wrongly sets the two tuners as the loop-through mode or separate mode, the two tuners can not function properly.

【Disclosure】
【Technical Problem】

The present invention, to solve the problem of the above-described conventional art, provides a method and an apparatus for setting a connection state of a dual tuner that can allow a satellite line connection state of each tuner to be automatically set in the digital broadcast receiver employing two tuners.

The present invention also provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user’s convenience by automatically
setting a satellite signal line connection state of each tuner, which is complicated to set.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can reduce the possibility of erroneously setting the tuner, which has been frequently generated, due to having the same transponder (TP) information for different satellites in case that a digital satellite equipment control (DiSEqC) switch is used.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can set a connection state of each tuner as any one of a single type, a loop-through type, a dual same type and a dual different type.

Furthermore, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user’s convenience by setting a tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recoding or watching.

【Technical Solution】

An aspect of the present invention features a method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners.
According to an embodiment of the present invention, a method of setting a tuner connection state of \( n \) satellites, \( n \) being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners includes the steps of setting the tuner connection state for each satellite by using a satellite signal received from each satellite, and setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

The step of setting the tuner connection state for each satellite includes the steps of determining whether each of a first tuner and a second tuner is tuned, by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite; if each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; tuning any one of the first tuner and the second tuner to a second satellite signal having polarization properties different from the first satellite signal if it is determined that the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; and setting the connection state of the
satellite as dual same if the first tuner and the second tuner are tuned by the first satellite signal and the second satellite signal, respectively.

The step of setting the tuner connection state between the satellites by using a connection state set for each satellite includes the steps of tuning each of the first tuner and the second tuner to the third satellite signal, extracting program specification information (PSI) or service information (SI) from the third satellite signal inputted through the first tuner, tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal, extracting second PSI or SI from the third satellite signal inputted through the second tuner, determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI and setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

Another aspect of the present invention features a digital broadcast receiver of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas.

According to an embodiment of the present invention, a digital broadcast receiver includes a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite; a demodulator, demodulating the satellite signal; a demultiplexer, classifying the demodulated satellite signal in accordance with data type
and outputting the classified data; a decoder, decoding each of the data classified by the demultiplexer; and a processor, setting a tuner connection state corresponding to \( N \) satellites, \( N \) being a natural number, by use of the satellite signal inputted through the tuner, whereas the processor sets a connection state of the tuner for each satellite, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each satellite.

【Advantageous Effects】

By providing a method and an apparatus for setting a connection state of a dual tuner in accordance with the present invention, a satellite line connection state of each tuner can be automatically set in the digital broadcast receiver employing two tuners.

With the present invention, a user's convenience can be improved by automatically setting a satellite line connection state of each tuner, which is complicated to set. With the present invention, the possibility of erroneously setting the tuner, which has been frequently generated, can be reduced by having the same TP information for different satellites in case that a digital satellite equipment control (DiSEqC) switch is used.

With the present invention, a connection state of each tuner can be set as any one of a single type, a loop-through type, a dual same type and a dual different type.

With the present invention, a user's convenience can be improved by setting a
tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recording or watching.

【Description of Drawings】

FIG. 1 illustrates a connection state of a general digital broadcast receiver;

FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention;

FIG. 3 and FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite;

FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver;

FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention;

FIG. 7 illustrates a flow chart illustrating a method of setting a connection state of each tuner for M satellites searched by a digital broadcast receiver;

FIG. 8 is a state table for setting a connection state of setting M antennas in accordance with an embodiment of the present invention;

FIG. 9 is a flow chart illustrating a method of setting a connection state of
setting M antennas in accordance with an embodiment of the present invention; and

FIG. 10 is a flow chart illustrating a method of setting a connection state between satellites in accordance with an embodiment of the present invention.

5【Mode for Invention】

Since there can be a variety of permutations and embodiments of the present invention, certain embodiments will be illustrated and described with reference to the accompanying drawings. This, however, is by no means to restrict the present invention to certain embodiments, and shall be construed as including all permutations, equivalents and substitutes covered by the spirit and scope of the present invention. Throughout the drawings, similar elements are given similar reference numerals.

Hereinafter, the embodiments will be described with reference to the accompanying drawings, examples of which are illustrated in the accompanying drawings, wherein like reference numbers refer to like elements throughout. Throughout the description of the present invention, when describing a certain technology is determined to evade the point of the present invention, the pertinent detailed description will be omitted.

FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention, and FIG. 3 and
FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite. FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver.

Referring to FIG.2, a digital broadcast receiver 200 in accordance with the present invention comprises two tuners 210a and 210b, a demodulator 215, a demultiplexer 220, a decoder 225, a data output unit 230, a memory 235 and a processor 240. FIG. 2 illustrates the digital broadcast receiver 200 employing two tuners only. However, it shall be evident that the digital broadcast receiver 200 in accordance with the present invention can have two or more tuners. Similarly, FIG. 2 illustrates that the digital broadcast receiver 200 includes one demultiplexer 220 and one decoder 225. However, the digital broadcast receiver 200 in accordance with the present invention can have the same numbers of the demultiplexer 220 and the decoder 225, respectively, as the number of the provided tuners 210 in accordance with a method of embodying the digital broadcast receiver 200.

The demodulator 215, by the control of the processor 240, demodulates and transfers to the demultiplexer 220 a signal (i.e. an electrical signal) inputted through the tuners 210a and 210b.

The demultiplexer 220 parses an audio signal, a video signal and data, demodulated and inputted by the demodulator 215, and divides the audio signal, the video signal and the data in accordance with each data type to output the respective
divided signals to the decoder 225. In the drawing, one decoder 225 is illustrated. It is
evident, however, that the decoder 225 can be realized as a video decoder, an audio
decoder and a data decoder in accordance with the function of the decoder 225. The data
type can be video data, audio data and/or information data.

The decoder 225 decodes the original audio, video and data signals (hereinafter,
referred to as “information data” for the convenience of understanding and description)
by decoding the respective data, divided and inputted by the demultiplexer 220 by the
control of the processor 240, in accordance with a predetermined method. Also, the
decoder 225, by the control of the processor 240, outputs through the output unit 230 or
stores in the memory 235 the respective data. FIG. 2 illustrates that one decoder 225
decodes the video, audio and information data. However, it is shall be evident that an
individual decoder (e.g. a video decoder, an audio decoder and an information decoder)
can be provided to decode each kind of data.

The memory 235 can include a volatile memory and a non-volatile memory.

The video data, the audio data and the information data, decoded by the decoder 225,
are written in the memory 235 by the control of the processor 240. The memory 235
also stores an algorithm to operate the digital broadcast receiver 200 in accordance with
the present invention.

The data output unit 230, by the control of the processor 240, outputs the video
and/or audio data stored in the memory 235 or outputs the information data by the
on-screen display (OSD) method. The OSD indicates a screen of a display apparatus (e.g. a monitor or a television), coupled to the data output unit 230, on which desired information is self-displayed without the input of an additional video signal. Of course, the data output unit 230 can output the respective data, decoded by the decoder 225, to the display apparatus by the control of the processor 240.

The processor 240 controls internal elements of the digital broadcast receiver 200 in accordance with the present invention (e.g. the tuners 210a and 210b, the demodulator 215, the demultiplexer 220, the decoder 225, the data output unit 230 and memory 235).

Also, the processor 240 can set a connection state between each satellite and a tuner 210a or 210b corresponding to each satellite. This will be described below with reference to the related drawings.

In the digital broadcast receiver, the connection type of the satellite signal line can be classified in accordance with the number of signal lines. For example, in case that one signal line is provided, as illustrated in FIG. 3, only one signal is connected to the satellite signal line at a time by connecting a digital satellite equipment control (DiSEqC) switch (not shown) in accordance with the number of the LNB. As illustrated in FIG. 4, in case that two signal lines are provided, the same satellite signals or different satellite signals are connected to two DiSEqC switches. The DiSEqC switch automatically selects a plurality of satellite antennas with one satellite receiver. One
receiver can typically receive signals from 4 antennas or polarized signals from up to 8 antennas.

First, a connection mode in accordance with a physical connection of satellite signal lines to each tuner will be briefly described for the convenience of understanding and the description. Hereinafter, the connection mode will be described based on the case of two tuners.

As illustrated in (a) of FIG. 5, a case in which any one (e.g. a first tuner 210a) of the two tuners 210a and 210b is connected to the satellite signal line is referred to as a “single tuner.” That is, the single tuner represents a mode in which any one of the two tuners is only used. For the convenience, the mode in which only the first tuner 210a (refer to FIG. 2) is connected to the satellite signal line is referred to as a “first single tuner.” Another mode in which only a second tuner 220b (refer to FIG. 2) is connected to the satellite signal line is referred to as a “second single tuner.”

As illustrated in (b) of FIG. 5, a connection mode in which the two tuners 210a and 210b are connected to one satellite signal line, and the same satellite signal is inputted to the first tuner 210a and the second tuner 210b, is referred to as a “loop-through.” That is, in the loop-through connection mode, an output part of the first tuner 210a and an input part of the second tuner 210b are connected. Accordingly, as illustrated in (b) of FIG. 5, a satellite signal received through the antenna can be inputted via an input part of the first tuner 210a and tuned. Then, the same satellite
signal outputted through the output part of the first tuner 210a can be inputted via the input part of the second tuner 220b and tuned. Here, the same satellite signal means a signal of the same polarization properties inputted from the same satellite. A satellite can send a satellite signal of vertically polarized wave properties and another satellite signal of horizontally polarized wave properties. In case of the loop-through, since one satellite signal line is connected to the antenna, the tuners 210a and 210b, respectively, can be tuned by the satellite signals of the same polarization properties.

As illustrated in (c) of FIG. 5, two satellite signal lines are connected to the tuners 210a and 210b. The satellite signal lines connected to the tuners 210a and 210b are connected to one or more antennas. The tuners 210a and 210b can receive a satellite signal from the same satellite. This connection mode is referred to as a “dual same.” In case of the dual same, since a satellite signal line is connected to each of the tuners 210a and 210b through the respective LNB, the tuners 210a and 210b can receive from the same satellite and tune to the respective satellite signal. For example, the first tuner 210a can receive and tune to a first satellite signal corresponding to the vertically polarized wave. The second tuner 210b can receive and tune to a second satellite signal corresponding to the horizontally polarized wave. In addition, as illustrated in (c) of FIG. 5, since the satellite signal lines connected to the respective tuners are coupled to one antenna, the first tuner 210a and the second tuner 210b, respectively, can receive signals of different polarization properties from the same satellite and be tuned.
As illustrated in (d) of FIG. 5, a connection mode in which each of the tuners 210a and 210b is connected to each satellite signal line through its own corresponding antenna is referred to as a "dual different." For example, in case of the dual different, since the input parts of the first and second tuners 210a and 210b are connected to the respective signal lines, the first and second tuners 210a and 210b can be independently tuned. Further, in case of the dual different, unlike the dual same, the satellite signal lines, each of which is connected to the first tuner 210a and the second tuner 210b, respectively, are connected to different satellites. The two tuners 210a and 210b are independently tuned by the different satellite signals.

FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention. It is hereinafter assumed that the digital broadcast receiver 200 employs two tuners 210a and 210b and the processor 240 sets and stores in the memory 235 an antenna connection state for M searched satellites, M being a natural number larger than zero. As such, when the connection state for the M searched satellites is stored, if the connection state for a satellite is required to be re-checked (e.g., a connection state in accordance with the change of antenna information through a menu of the channel search for a concerned satellite or the satellite state diagnosis is requested to be re-checked (or re-set)), the processor 240 can receive the satellite signal from a
transponder corresponding to the concerned satellite and set the connection state for each of the tuners 210a and 210b.

In a step represented by 610, the processor 240 determines whether the first tuner 210a and the second tuner 210b, respectively, are tuned by using each satellite signal of different polarization properties that is received from a transponder corresponding to the present satellite K.

For example, the first tuner 210a can try to be tuned to the first satellite signal received from the transponder. The second tuner 210b can try to be tuned to the second satellite signal having different polarization properties. The first and second satellite signals can be received through the same satellite or different satellites.

If the first tuner 210a and the second tuner 210b are tuned by the respective TP information of different polarization properties, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the separate in a step represented by 615.

However, if the first tuner 210a and the second tuner 210b are not tuned by the respective TP information, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the loop-through in a step represented by 620.

If the connection state of the first and second tuners 210a and 210b for the present satellite K is set in steps represented by 610 through 620, the processor 240 sets
the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N. A method of setting the connection state is described below.

To set the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the IP information received from the present satellite K (hereinafter, referred to as “first TP information” for the convenience of understanding and description) and the TP information received from the searched satellite N (hereinafter, referred to as “second TP information” for the convenience of understanding and description) and determines whether both the first tuner 210a and the second tuner 210b are tuned, in a step represented by 625.

For example, in case that the present satellite K and the searched satellite N employ the same antenna by using the same switch, the first tuner 210a and the second tuner 210b cannot be independently tuned at the same time.

Accordingly, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the first TP information and the second TP information received from each respective satellite. As a result of tuning them, if the first and second tuners 210a and 210b are independently tuned, the processor 240 determines that the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N is the separate. If the first tuner 210a and the second tuner 210b,
respectively, are independently tuned, in a step represented by 630, the processor 240
writes in the memory 255 the connection state of each of the tuners 210a and 210b
between the present satellite K and the searched satellite N as the separate.

If the first tuner 210a and the second tuner 210b, respectively, are not
independently tuned, in a step represented by 635, the processor 240 writes in the
memory 255 the connection state of each of the tuners 210a and 210b between the
present satellite K and the searched satellite N as the loop-through.

Here, the processor 240 can set a connection state of each of the tuners 210a
and 210b between the present satellite K and respective searched satellites by repeating
the steps represented by 625 through 635 M times.

FIG. 7 illustrates a flow chart illustrating a method of setting a connection state
of each tuner for M satellites searched by a digital broadcast receiver, and FIG. 8 is a
state table for setting a connection state of setting M antennas in accordance with an
embodiment of the present invention. The method of checking a connection state of the
satellite signal line of each of the tuners 210a and 210b by automatically tuning without
separate software setting will be described below in detail. It is assumed that the digital
broadcast receiver 200 employs two tuners 210a and 210b. Also, the method of setting a
connection state of each tuner 210a or 210b of the satellites and of between the satellites
in a state that M satellites, M being a natural number, are searched will be hereinafter
described. Here, since the method of searching M satellites and the method of setting antenna information for each satellite are well-known to those of ordinary skill in the art, the related description will be omitted.

Typically, a digital satellite broadcast signal is relayed through a transponder. The satellite broadcast antenna receives and transfers to the digital broadcast receiver 200 the digital satellite broadcast signal. The digital satellite broadcast signal received through each antenna is referred to as “TP information” or a “satellite signal” the convenience of understanding and description. The TP information or the satellite signal can be information in a transport stream unit. Also, the method of setting a connection state of each tuner 210a or 210b of the satellites and of between the satellites, corresponding to the set antenna information in a state that the satellite signal line connected to each antenna is physically coupled to each tuner 210a or 210b, will be described in detail.

Although the below description relates to the method of setting each antenna and connection state of the tuners 210a and 210b between the antenna settings for the setting of M antennas, the method of setting the connection state of M satellites and between the satellites will be described for the convenience of understanding and description.

If M satellites are searched through a plurality of antennas as illustrated in FIG. 8, the connection state of each tuner 210a or 210b of each satellite and between the
satellites is set by checking the connection state $M \times M$ times.

Briefly describing FIG. 8, "A" represents each component, in which the two

tuners 210a and 210b are tuned by using each of the TP information having different

polarization properties received from each satellite (i.e. each of the TP information

having different polarization properties received from one satellite). "B" and "C"

represent components, in which the tuners 210a and 210b are tuned by using TP

information received from different satellites. That is, B and C set the connection state

between the satellites by using the connection state set by A. Since B and C are

symmetrical with each other, and thus the connection state for any one component of B

and C is required to be set and used, it is assumed that the connection state for one

component is set.

Referring to FIG. 7, if M satellites are searched in a step represented by 710,

first, the connection state of each satellite having corresponding antenna information is

set. For example, referring to FIG. 8, a diagonal group 810 sets the connection state of

each satellite having concerned antenna information. Accordingly, the tuner connection

state of each satellite $x$, $x$ being a natural number, can be checked by tuning the first

tuner 210a and the second tuner 210b with a satellite signal transmitted from the

satellite $x$.

For example, assuming that the first tuner 210a is tuned to the first satellite

signal but the second tuner 210b is not tuned, the processor 240 can set the tuner
connection of the satellite x as the first single tuner. This is described below in detail with reference to FIG. 9.

Once the whole tuner connection state of the respective M satellites is set, the processor 240 sets, in a step represented by 620, the connection state of the tuners 210a and 210b of each satellite (e.g. the first satellite and the second satellite) having different antenna information by using the connection state by the step represented by 610. This is described below in detail with reference to FIG. 10.

For example, referring to FIG. 8, since all connection states of each tuner 210a or 210b of the respective satellite x are set, the connection state of the tuners 210a and 210b of each satellite (i.e. the first satellite and the second satellite) having different antenna settings can be set by using the connection state of the satellite x.

Referring to FIG. 8, since a first area 820 and a second area 830 correspond to each other, the whole connection state can be set by setting the tuner connection state of each satellite for any one of the first area 820 and the second area 830.

FIG. 9 is a flow chart illustrating a method of setting a connection state of setting M antennas in accordance with an embodiment of the present invention. The method of setting the connection state of each satellite x, x being a natural number larger than zero, of the diagonal group 810 will be described with reference to FIG. 8. That is, the method of setting the tuner connection state for the component A will be
hereinafter described. Further, the method of setting each tuner connection state after receiving at least one item of TP information (i.e. satellite signal) having different polarization properties from at least one transponder corresponding to a satellite x will be described.

Although the below description relates to the method of setting the connection state for respective N antenna settings, the method of setting the connection state of N satellites will be described for the convenience of understanding and description.

Referring to FIG. 9, in a step represented by 910, the processor 240 determines whether the first tuner 210a and the second tuner 210b can be tuned by tuning each of the first tuner 210a and the second tuner 210b by use of the same satellite signal (hereinafter, commonly referred to as TP information).

If neither the first tuner 210a nor the second tuner 210b is tuned by using the same TP information, the processor 240 recognizes and writes in the memory 235 the connection state of the satellite x as the single tuner, using any one of the first tuner 210a and the second tuner 210b, in a step represented by 915.

However, if both the first tuner 210a and the second tuner 210b are tuned by using the same TP information, the processor 240 extracts program specification information (PSI) or service information (SI) from a satellite signal inputted from the first tuner 210a and the second tuner 210b, respectively, in a step represented by 920.

Then, the processor 240 compares the extracted PSI or SI information with each other in
a step represented by 925.

For example, let us assume that the PSI or the SI extracted through the first tuner 210a is referred to as a “first PSI” or a “first SI”, and the PSI or the SI extracted through the second tuner 210b is referred to as a “second PSI” or a “second SI.” If it is determined that each of the abstracted PSI or SI is identical to each other, the processor 240 can recognize the connection state as at least the loop-through. If it is determined that each of the abstracted PSI or SI is different from each other, the processor 240 can recognize that the TP information tuned by the first tuner 210a and the second tuner 210b is not transmitted from the same satellite. That is, the processor 240 can recognize that the concerned TP information overlaps in at least two satellites. The PSI or the SI is included in the digital video broadcasting (DVB) standard in accordance with the digital satellite broadcast, and the PSI is included in the MPEG-2 standard. Since the method of extracting the PSI or the SI from the inputted TP information is well-known to any person of ordinary skill in the art, the redundant description will be omitted.

If it is determined that each of the PSI or SI is not identical to each other, the processor 240 returns to the step represented by 915 and writes the connection state of the respective satellite x in the memory 235.

If it is determined that each of the PSI or SI is identical to each other, the processor 240 determines, in a step represented by 930, whether both the first tuner 210a and the second tuner 210b are tuned by tuning any one of the first tuner 210a and
the second tuner 210b having the TP information of different polarization properties.

For example, a state in which the first tuner 210a and the second tuner 210b, respectively, are tuned by using TP information of vertically polarized wave (hereinafter, referred to as "first TP information") is assumed. In the state, the processor 240 tunes the first tuner 210a by using TP information of horizontally polarized wave (hereinafter, referred to as "second TP information") and then determines whether the first tuner 210 and the second tuner 210b are tuned.

As a result, if the first tuner 210a is tuned only and the TP information is not inputted, the processor 240 recognizes and sets the connection state of the pertinent satellite x as at least the loop-through, in a step represented by 935.

If both the first tuner 210a and the second tuner 210b are tuned, that is, the first tuner 210a and the second tuner 210b, respectively, are tuned by using the TP information of different polarized wave, the processor 240 recognizes and sets the connection state of the concerned satellite x as at least the dual same in a step represented by 940.

The processor 240 can set the tuner connection state of the respective M satellites by repeating the steps represented by 910 through 940.

FIG. 10 is a flow chart illustrating a method of setting a connection state of each satellite in accordance with the present invention. Assuming that all connection
states of each satellite x of the diagonal group 810 are checked by first setting a connection state of M antennas in FIG. 9, the method of checking the connection state of each satellite of the first area 820 in FIG. 8 by use of the connection state of the concerned satellite x will be described below. That is, Since B and C are symmetrical with each other, the connection state of each satellite for any one of B and C will be described.

Although the below description relates to the method of setting the connection state for setting each of the M antenna, the method of setting the connection state of M satellites will be described for the convenience of understanding and description.

Further, the method of setting the connection state of each satellite after receiving the TP information corresponding to each satellite from the transponders corresponding to the two satellites will be described below.

The processor 240 first sets the connection state between the satellites logically and evidently deduced from the connection state of each satellite having the same antenna information, which is not illustrated in FIG. 10.

For example, if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the first single tuner, the processor 240 sets the connection states of the first and second satellites as the first single tuner. If the first satellite and the second satellite, respectively, are the second single tuner, the processor 240 can set the connection states of the first satellite and the second satellite
as the second single tuner.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the other, since the first satellite and the second satellite each can independently tune satellite signals that are physically different, the processor 240 sets the connection states of the first satellite and the second satellite as the dual different.

Also, if the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

Of course, if the connection state of the first satellite is the dual same, and the connection state of the second satellite is any one of the first and second single tuners, the processor 240 can similarly set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.
If the connection state of the first satellite and the second satellite, respectively, is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual same.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the loop-through, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is any one of the first and second single tuners, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the loop-through, one of the two cases are possible. In one case, the first satellite and the second satellite can independently perform tuning at the same time. In the other case, the first satellite and the second satellite cannot independently perform tuning at the same time. Accordingly, in such a
case, the connection state between the satellites may be checked and set through the following method. This method will be described in detail with reference to FIG. 10.

Referring to FIG. 10, the processor 240 tries, in a step represented by 1010, to tune the first tuner 210a and the second tuner 210b by using the same TP information (hereinafter, referred to as "third TP information"). For example, the processor 240 tunes the first tuner 210a by use of the third TP information before tuning the second tuner 210b by use of the third TP information.

In a step represented by 1015, the processor 240 obtains PSI or SI from the third TP information inputted through the first tuner 210a. Since the method of obtaining the PSI or SI is well-known to any person of ordinary skill in the art, the pertinent description will be omitted. For the convenience, the PSI or SI obtained from a satellite signal inputted through the first tuner 210a tuned with the third TP information will be referred to as third PSI information or third SI information.

In a step represented by 1020, the processor 240 tunes the first tuner 210a by using TP information (referred to as "fourth TP information", for the purpose of convenience) that is transmitted from a different satellite and is different from the third TP information.

In this state, if the third TP information tuned to the second tuner 210b is disconnected, the connection state of between two satellites can be recognized as at least the loop-through. The third TP information tuned to the second tuner 210b is not
inputted, it can be inferred that the physical connection mode of the tuners 210a and 210b is the single tuner or the loop-through.

In a step represented by 1025, the control unit extracts PSI or SI (referred to as “fourth PSI or fourth SI” for the purpose of convenience) from a satellite signal inputted through the second tuner 210b tuned with the third TP information.

The processor 240 determines whether the third PSI or the third SI is identical to the fourth PSI or the fourth SI in a step represented by 1030.

As a result, if it is determined that the third PSI or the third SI is identical to the fourth PSI or the fourth SI, the processor 240 writes, in a step represented by 1035, in the memory 235 that the connection state between two satellites is the dual different.

Since that the third PSI or the third SI is identical to the fourth PSI or the fourth SI means that the second tuner 210b is not disconnected, this also means that the first satellite and the second satellite can independently perform tuning at the same time.

If it is determined that the third PSI or the third SI is not identical to the fourth PSI or the fourth SI, the processor 240 writes in the memory 235 that the connection state between two satellites is the single tuner, in a step represented by 1040. Of course, the connection state between the two satellites can be the loop-through. However, since the respective two satellites cannot independently tune, the connection state can be configured to be the single tuner, for the purpose of convenience.

The processor 240 checks and sets the connection state of every satellite by
repeating the steps represented by 1010 through 1040.

【Industrial Applicability】

Hitherto, although some embodiments of the present invention have been shown and described for the above-described objects, it will be appreciated by any person of ordinary skill in the art that a large number of modifications, permutations and additions are possible within the principles and spirit of the invention, the scope of which shall be defined by the appended claims and their equivalents.
[CLAIMS]

[Claim 1]

A method of setting a tuner connection state of \( n \) satellites, \( n \) being a natural number, the satellites being connected to one or more antennas, the method executed in a digital broadcast receiver comprising a plurality of tuners, the method comprising:

setting the tuner connection state for each satellite by using a satellite signal received from each satellite; and

setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

[Claim 2]

The method of Claim 1, wherein each of the respective satellites comprises information on one antenna, and

the antenna information comprises a combination of at least one or more items of low noise block down converter information, 22KHz tone information, satellite information and digital satellite equipment control information.

[Claim 3]

The method of Claim 1, wherein the step of setting the tuner connection state for each satellite comprises:
determining whether each of a first tuner and a second tuner is tuned, by tuning
each of the first tuner and the second tuner to a first satellite signal received from a
satellite;

if each of the first tuner and the second tuner is tuned, extracting program
specification information (PSI) or service information (SI) from the first satellite signal
inputted through the first tuner and the second tuner, respectively, and determining
whether the PSI or SI extracted from the first satellite signal inputted through the first
tuner and the PSI or SI extracted from the first satellite signal inputted through the
second tuner are identical to each other;

tuning any one of the first tuner and the second tuner to a second satellite signal
having polarization properties different from the first satellite signal if it is determined
that the PSI or SI extracted from the first satellite signal inputted through the first tuner
and the PSI or SI extracted from the first satellite signal inputted through the second
tuner are identical to each other; and

setting the connection state of the satellite as dual same if the first tuner and the
second tuner are tuned by the first satellite signal and the second satellite signal,
respectively.

【Claim 4】

The method of Claim 3, further comprising a step of setting the connection state
of the satellite as single tuner if any one of the first tuner and the second tuner is not
tuned to a second satellite signal.

【Claim 5】

5 The method of Claim 3, further comprising a step of setting the connection state
of the satellite as single tuner if the PSI or SI extracted from the first satellite signal
inputted through the first tuner and the PSI or SI extracted from the first satellite signal
inputted through the second tuner are not identical to each other.

【Claim 6】

10 The method of Claim 3, further comprising a step of setting the connection state
of the satellite as loop-through if any one of the first tuner and the second tuner is tuned,
and then the other tuner is disconnected.

【Claim 7】

15 The method of Claim 1, wherein the step of setting the tuner connection state
between the satellites by using a connection state set for each satellite comprises:

tuning each of the first tuner and the second tuner to the third satellite signal;
extracting program specification information (PSI) or service information (SI)
from the third satellite signal inputted through the first tuner;
tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal;

extracting second PSI or SI from the third satellite signal inputted through the second tuner;

determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI; and

setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

【Claim 8】

The method of Claim 7, further comprising a step of setting the connection state between the satellites as the single tuner if the extracted first PSI or SI is not identical to the extracted second PSI or SI.

【Claim 9】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as a first single tuner if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the first single tuner.
[Claim 10]

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as dual different if the connection state of the first satellite is the loop-through, and the connection state of the second satellite is dual same.

[Claim 11]

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual same if the connection state of the first satellite is the dual same, and the connection state of the second satellite is the dual same.

[Claim 12]

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual different if the connection state of the first satellite is any one of the first single tuner and the second single tuner, and the connection state of the second satellite is the dual same.

[Claim 13]

The method of Claim 7, further comprising a step of setting the connection state
between a first satellite and a second satellite as the dual different if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the second single tuner.

5  **[Claim 14]**

A digital broadcast receiver, comprising:

a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite;

a demodulator, demodulating the satellite signal;

10 a demultiplexer, classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder, decoding each of the data classified by the demultiplexer; and

a processor, setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner,

15 whereas the processor sets a connection state of the tuner for each satellite, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each satellite.

**[Claim 15]**

20 The digital broadcast receiver of Claim 14, further comprising a memory
storing the set tuner connection state between the satellites.

【Claim 16】
The digital broadcast receiver of Claim 14, wherein the processor tunes each of a first tuner and a second tuner by using a fifth satellite signal received through a satellite, and if any one of the first tuner and the second tuner is not tuned, the processor sets the tuner connection of the satellite as a single tuner.

【Claim 17】
The digital broadcast receiver of Claim 14, wherein if each of the first tuner and the second tuner is tuned to the fifth satellite signal, the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, and if it is determined that the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, tunes any one of the first tuner and the second tuner to a sixth satellite signal, the sixth satellite signal being a signal for a satellite that is different from the satellite of the fifth satellite signal, and then, if each of
the first tuner and the second tuner is tuned by the fifth satellite signal and the sixth satellite signal, respectively, sets the tuner connection state of the satellite as dual same.

【Claim 18】

5 The digital broadcast receiver of Claim 17, wherein the processor tunes any one of the first tuner and the second tuner to the sixth satellite signal and then sets the tuner connection state of the satellite as loop-through if any one of the first tuner and the second tuner is not tuned.

【Claim 19】

10 The digital broadcast receiver of Claim 17, wherein the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, and, if it is determined that the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, sets the tuner connection state of the satellite as single tuner.

【Claim 20】

20 The digital broadcast receiver of Claim 14, wherein, if the connection state of
each of a third satellite and a fourth satellite is a first single tuner, the processor sets a
tuner connection state between the third satellite and the fourth satellite as a first single
tuner, and

if the connection state of each of the third satellite and the fourth satellite is a
second single tuner, the processor sets the tuner connection state between the third
satellite and the fourth satellite as a second single tuner.

【Claim 21】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a
third satellite is any one of a first single tuner and a second single tuner, and a
connection state of a fourth satellite is the other, the processor sets a tuner connection
state between the third satellite and the fourth satellite as dual different.

【Claim 22】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a
third satellite is any one of a first single tuner, a second single tuner and loop-through,
and a connection state of a fourth satellite is dual same, the processor sets a tuner
connection state between the third satellite and the fourth satellite as dual different.

【Claim 23】
The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is dual same, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 24】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner and a second single tuner, and a connection state of a fourth satellite is loop-through, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 25】

The digital broadcast receiver of Claim 14, wherein, if a connection state of each of a third satellite and a fourth satellite is loop-through, the processor determines whether the first tuner and the second tuner can be independently tuned at the same time and, if the first tuner and the second tuner can be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 26】
The digital broadcast receiver of Claim 25, wherein, if the first tuner and the second tuner can not be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as a single tuner.
【ABSTRACT】

The present invention relates to a connection state setting method of a dual tuner and an apparatus. In accordance with an embodiment of the present invention, the method of setting a tuner connection state of n satellites in a digital broadcast receiver having the plurality of tuners, n being a natural number, that are connected to one or more antennas includes setting the tuner connection state for each satellite by using a satellite signal inputted from each satellite, which has information on one antenna, and setting the tuner connection state between the satellites by using a connection state set for each satellite and the satellite signal inputted from each satellite. Accordingly, with the present invention, the digital broadcast receiver having two tuners can automatically set the connection state of satellite lines of each tuner.
FIG. 3

Satellite 1 ...... Satellite M

Switch ~ 310

Signal line
Satellite 1 ... Satellite L ... Satellite 1 ... Satellite M

Switch 310 Signal line 1

Switch 310 Signal line 2
Start

Can each tuner be independently tuned?

Yes
Write tuner connection state of present satellite as separate

No

Write tuner connection state of present satellite as loop-through

Can each tuner be independently tuned by TP information provided from different satellite?

Yes
Write tuner connection state between satellites as separate

No

Write tuner connection state between satellites as loop-through

End
Start

Set tuner connection state of each satellite

Set tuner connection state between the satellites by using tuner connection state of each satellite

End
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>⋯</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>⋮</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

810

820

830
Start

Can both first tuner and second tuner be tuned with use of same TP information?

Yes

Extract SI information from TP information inputted from each of first tuner and second tuner

Are the SI information identical to each other?

Yes

Is first tuner tuned by using TP information having different polarization properties?

Yes

Write as dual same

No

Write as loop-through

No

Write as single tuner

End
Start

Tune first tune and second tune to same TP information

Extract SI information from TP information inputted through first tuner

Tune first tune to TP information of other satellite

Extract SI information from TP information inputted through second tuner

Are the SI information identical to each other?

Yes

Write as dual different

No

Write as single tuner

End
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>For receiving Office use only</td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>International Application No.</td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>International Filing Date</td>
<td></td>
</tr>
<tr>
<td>0-3</td>
<td>Name of receiving Office and &quot;PCT International Application&quot;</td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>Form PCT/RO/101 PCT Request</td>
<td>PCT-SAFE</td>
</tr>
<tr>
<td>0-4-1</td>
<td>Prepared Using</td>
<td>Version 3.51.005.180 MT/FOP 20060401/0.20.4rc.2.7</td>
</tr>
<tr>
<td>0-5</td>
<td>Petition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty</td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>Receiving Office (specified by the applicant)</td>
<td>Korean Intellectual Property Office (RO/KR)</td>
</tr>
<tr>
<td>0-7</td>
<td>Applicant’s or agent’s file reference</td>
<td>OPF0670/PCT</td>
</tr>
<tr>
<td>I</td>
<td>Title of invention</td>
<td>METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER</td>
</tr>
<tr>
<td>II</td>
<td>Applicant</td>
<td></td>
</tr>
<tr>
<td>II-1</td>
<td>This person is</td>
<td>applicant only</td>
</tr>
<tr>
<td>II-2</td>
<td>Applicant for</td>
<td>all designated States except US</td>
</tr>
<tr>
<td>II-4</td>
<td>Name</td>
<td>HUMAX CO., LTD.</td>
</tr>
<tr>
<td>II-5</td>
<td>Address</td>
<td>HUMAX Venture Tower 271-2, Seohyeon-dong, Bundang-gu, Seongnam-si, Gyeonggi-do 463-050 Republic of Korea</td>
</tr>
<tr>
<td>II-6</td>
<td>State of nationality</td>
<td>KR</td>
</tr>
<tr>
<td>II-7</td>
<td>State of residence</td>
<td>KR</td>
</tr>
<tr>
<td>II-8</td>
<td>Telephone No.</td>
<td>82-31-600-6214</td>
</tr>
<tr>
<td>II-9</td>
<td>Facsimile No.</td>
<td>82-31-600-6100</td>
</tr>
<tr>
<td>II-10</td>
<td>e-mail</td>
<td><a href="mailto:ekkkwak@humaxdigital.com">ekkkwak@humaxdigital.com</a></td>
</tr>
<tr>
<td>II-11</td>
<td>Applicant’s registration No. with the Office</td>
<td>1-1998-000063-1</td>
</tr>
<tr>
<td>III-1</td>
<td>Applicant and/or inventor</td>
<td>applicant and inventor</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>III-1-1</td>
<td>This person is</td>
<td></td>
</tr>
<tr>
<td>III-1-2</td>
<td>Applicant for</td>
<td>US only</td>
</tr>
<tr>
<td>III-1-4</td>
<td>Name (LAST, First)</td>
<td>KIM, Jun-Hyung</td>
</tr>
<tr>
<td>III-1-5</td>
<td>Address</td>
<td>1-207, Sejong Grancia, 187-3 Gumi-dong, Bundang-gu, Seongnam-si Gyeonggi-do463-500 Republic of Korea</td>
</tr>
<tr>
<td>III-1-6</td>
<td>State of nationality</td>
<td>KR</td>
</tr>
<tr>
<td>III-1-7</td>
<td>State of residence</td>
<td>KR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III-2</th>
<th>Applicant and/or inventor</th>
<th>applicant and inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>III-2-1</td>
<td>This person is</td>
<td></td>
</tr>
<tr>
<td>III-2-2</td>
<td>Applicant for</td>
<td>US only</td>
</tr>
<tr>
<td>III-2-4</td>
<td>Name (LAST, First)</td>
<td>YI, Ho</td>
</tr>
<tr>
<td>III-2-5</td>
<td>Address</td>
<td>103-604, Kkachimaeul, 77 Gumi-dong, Bundang-gu, Seongnam-si Gyeonggi-do463-500 Republic of Korea</td>
</tr>
<tr>
<td>III-2-6</td>
<td>State of nationality</td>
<td>KR</td>
</tr>
<tr>
<td>III-2-7</td>
<td>State of residence</td>
<td>KR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III-3</th>
<th>Applicant and/or inventor</th>
<th>applicant and inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>III-3-1</td>
<td>This person is</td>
<td></td>
</tr>
<tr>
<td>III-3-2</td>
<td>Applicant for</td>
<td>US only</td>
</tr>
<tr>
<td>III-3-4</td>
<td>Name (LAST, First)</td>
<td>CHO, Min-Haeng</td>
</tr>
<tr>
<td>III-3-5</td>
<td>Address</td>
<td>2111, C-dong, Intellege, 24 Jeongja-dong, Bundang-gu, Seongnam-si Gyeonggi-do463-010 Republic of Korea</td>
</tr>
<tr>
<td>III-3-6</td>
<td>State of nationality</td>
<td>KR</td>
</tr>
<tr>
<td>III-3-7</td>
<td>State of residence</td>
<td>KR</td>
</tr>
</tbody>
</table>
### IV-1 Agent or common representative; or address for correspondence

The person identified below is hereby has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

**IV-1-1 Name (LAST, First)**

Lee, Kyeong-Ran

**IV-1-2 Address**

502 BYC Bldg., 648-1 Yeoksam 1-dong, Kangnam-ku, Seoul 135-081

Republic of Korea

**IV-1-3 Telephone No.**

82-2-565-6727

**IV-1-4 Facsimile No.**

82-2-565-6726

**IV-1-5 e-mail**

palkr@ez-patent.co.kr

**IV-1-6 Agent's registration No.**

9-1998-000651-6

### V DESIGNATIONS

**V-1** The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

**V-2** Item V-2 may only be used to exclude (irrevocably) the designations concerned if, at the time of filing, the international application contains a priority claim to an earlier national application filed in the particular State concerned, in order to avoid the ceasing of the effect, under the national law, of this earlier national application. As to the consequences of such national law provisions in these States, see the PCT Applicant’s Guide, Volume I/A, in the relevant Annex B1.

**VII-1** International Searching Authority Chosen

Korean Intellectual Property Office (ISA/KR)
<table>
<thead>
<tr>
<th>VIII</th>
<th>Declarations</th>
<th>Number of declarations</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIII-1</td>
<td>Declaration as to the identity of the inventor</td>
<td>–</td>
</tr>
<tr>
<td>VIII-2</td>
<td>Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent</td>
<td>–</td>
</tr>
<tr>
<td>VIII-3</td>
<td>Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application</td>
<td>–</td>
</tr>
<tr>
<td>VIII-4</td>
<td>Declaration of inventorship (only for the purposes of the designation of the United States of America)</td>
<td>–</td>
</tr>
<tr>
<td>VIII-5</td>
<td>Declaration as to non-prejudicial disclosures or exceptions to lack of novelty</td>
<td>–</td>
</tr>
<tr>
<td>IX</td>
<td>Check list</td>
<td>number of sheets</td>
</tr>
<tr>
<td>IX-1</td>
<td>Request (including declaration sheets)</td>
<td>5</td>
</tr>
<tr>
<td>IX-2</td>
<td>Description</td>
<td>16</td>
</tr>
<tr>
<td>IX-3</td>
<td>Claims</td>
<td>5</td>
</tr>
<tr>
<td>IX-4</td>
<td>Abstract</td>
<td>1</td>
</tr>
<tr>
<td>IX-5</td>
<td>Drawings</td>
<td>6</td>
</tr>
<tr>
<td>IX-7</td>
<td>TOTAL</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IX</th>
<th>Accompanying Items</th>
<th>paper document(s) attached</th>
<th>electronic file(s) attached</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-8</td>
<td>Fee calculation sheet</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>IX-11</td>
<td>Copy of general power of attorney</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>IX-11</td>
<td>Copy of general power of attorney</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>IX-11</td>
<td>Copy of general power of attorney</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>IX-11</td>
<td>Copy of general power of attorney</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>IX-17</td>
<td>PCT-SAFE physical media</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>IX-19</td>
<td>Figure of the drawings which should accompany the abstract</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IX-20</td>
<td>Language of filing of the international application</td>
<td>Korean</td>
<td></td>
</tr>
</tbody>
</table>

<p>| X-1 | Signature of applicant, agent or common representative | |
| X-1-1 | Name (LAST, First) | |
| X-1-2 | Name of signatory | |
| X-1-3 | Capacity | |</p>
<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-1</td>
<td>Date of actual receipt of the purported international application</td>
</tr>
<tr>
<td>10-2</td>
<td>Drawings:</td>
</tr>
<tr>
<td>10-2-1</td>
<td>Received</td>
</tr>
<tr>
<td>10-2-2</td>
<td>Not received</td>
</tr>
<tr>
<td>10-3</td>
<td>Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application</td>
</tr>
<tr>
<td>10-4</td>
<td>Date of timely receipt of the required corrections under PCT Article 11(2)</td>
</tr>
<tr>
<td>10-5</td>
<td>International Searching Authority</td>
</tr>
<tr>
<td></td>
<td>ISA/KR</td>
</tr>
<tr>
<td>10-6</td>
<td>Transmittal of search copy delayed until search fee is paid</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>11-1</td>
<td>Date of receipt of the record copy by the International Bureau</td>
</tr>
</tbody>
</table>
특허 협력 조약
(PATENT COOPERATION TREATY)
발신: 수리관청
수신: LEE, Kyeong-Ran
502 BYC Bldg., 648-1 Yeoksam 1-dong, Kangnam-ku, Seoul 135-081 Republic of Korea

발송일 (일/월/년) 05 DECEMBER 2006 (05.12.2006)

출원인 또는 대리인의 서류참조기호
OFP0670/PCT

 중요통지사항

국제출원번호
PCT/KR2006/005037
국제출원일 (일/월/년) 28 NOVEMBER 2006 (28.11.2006)
우선일 (일/월/년) 29 NOVEMBER 2005 (29.11.2005)

출원인
HUMAX CO., LTD. et al

발명의 명칭
METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

1. 이 국제출원은 위에 기재된 바와 같이 국제출원번호와 국제출원일이 부여되었습니다.

2. 이 국제출원의 기록원본은:

☐ 자료 국제사무국에 송부되었습니다.

☐ 아래의 사유로 인하여 아직 국제사무국에 송부되지 않았으며, 이 통지서의 사본은 국제사무국에 송부되었습니다*:

☐ 국가안전보장에 필요한 허가를 얻지 못했음

☐ 기타 (이/유를 상술):

* 자기주장 관련 안내

* 국제사무국은 수리관청에 의한 기록원본의 송달을 감사하고 그 접수사실을 출원인에게 통지합니다. (서식 PCT/I/301). 국제사무국은 우선일부터 14일에 경과할 때까지 기록원본을 수령하지 않은 때에는 출원인에게 이를 통지합니다. (규칙 22.1(c)).
PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

To:
LEE, Kyeong-Ran
502 BYC Bldg., 648-1
Yeoksam 1-dong, Kangnam-ku
Seoul 135-081
RÉPUBLIQUE DE CORÉE

PCT
NOTIFICATION OF RECEIPT OF
RECORD COPY
(PCT Rule 24.2(a))

Date of mailing (day/month/year)
22 December 2006 (22.12.2006)

Applicant's or agent's file reference
OPF0670/PCT

INTERNATIONAL APPLICATION No.
PCT/KR2006/005037

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

HUMAX CO., LTD. (for all designated States except US)
KIM, Jun-Hyung et al (for US)

International filing date:
28 November 2006 (28.11.2006)

Priority date(s) claimed:
29 November 2005 (29.11.2005)
14 November 2006 (14.11.2006)

Date of receipt of the record copy by the International Bureau:

List of designated Offices:
AP: BW, CH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW
EA: AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
EP: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO,
    SE, SI, SK, TR
OA: BF, BJ, CP, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
National: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK,
    DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
    KZ, LA, LC, LF, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
    OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US,
    UZ, VC, VN, ZA, ZM, ZW

ATTENTION: The applicant should carefully check the data appearing in this notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau. In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- time limits for entry into the national phase - see updated important information (as of April 2002)
- requirements regarding priority documents (if applicable)

A copy of this notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Parianou Christina

Facsimile No. +41 22 338 70 90
Telephone No. +41 22 338 70 58

Form PCT/IB/301 (October 2005)
INFORMATION ON ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated on the cover sheet of this notification by paying national fees and furnishing translations, as prescribed by Articles 22 and 39 and the applicable national laws. In addition, the applicant may also have to comply with other special requirements applicable in certain Offices. It is the applicant’s responsibility to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most Offices do not issue reminders to applicants in connection with the entry into the national phase.

The applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be 30 MONTHS from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of 19 months from the priority date (see Article 39(1)), but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see PCT Gazette No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the PCT Newsletter, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the PCT Gazette ("Section IV" part published on a weekly basis), to the PCT Newsletter (on a monthly basis) and to the relevant National Chapters in Volume II of the PCT Applicant's Guide (the paper version of which is updated usually twice a year and the Internet version of which is updated usually on a weekly basis). Finally, a cumulative table of all applicable time limits for entering the national phase is available from WIPO's Internet site, via links from various pages of the site, including those of the Gazette, Newsletter and Guide, at http://www.wipo.int/pct/en/index.html.

Information about the requirements for filing a demand for international preliminary examination is set out in the PCT Applicant's Guide, Volume I/A, Chapter IX. Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or International application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before the date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau and if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances (Rule 17.1(c)).

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit (and all other PCT time limits) is the filing date of the earliest application whose priority is claimed (Article 2(x)(b)).
From the INTERNATIONAL BUREAU

To:

LEE, Kyeong-Ran
502 BYC Bldg., 648-1
Yeoksam 1-dong, Kangnam-ku
Seoul 135-081
RÉPUBLIQUE DE CORÉE

<table>
<thead>
<tr>
<th>Date of mailing (day/month/year)</th>
<th>22 January 2007 (22.01.2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant's or agent's file reference</td>
<td>OPF0670/PCT</td>
</tr>
<tr>
<td>International application No.</td>
<td>PCT/KR2006/005037</td>
</tr>
<tr>
<td>International publication date (day/month/year)</td>
<td>Not yet published</td>
</tr>
<tr>
<td><strong>IMPORTANT NOTIFICATION</strong></td>
<td></td>
</tr>
<tr>
<td>International filing date (day/month/year)</td>
<td>28 November 2006 (28.11.2006)</td>
</tr>
<tr>
<td>Priority date (day/month/year)</td>
<td>29 November 2005 (29.11.2005)</td>
</tr>
<tr>
<td>Applicant</td>
<td>HUMAX CO., LTD. et al</td>
</tr>
</tbody>
</table>

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. (If applicable) The letters "NR" appearing in the right-hand column denote a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

3. (If applicable) An asterisk (*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b) (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<table>
<thead>
<tr>
<th>Priority date</th>
<th>Priority application No.</th>
<th>Country or regional Office or PCT receiving Office</th>
<th>Date of receipt of priority document</th>
</tr>
</thead>
</table>

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Philippe Becamel

Facsimile No. +41 22 338 92 80
Telephone No. +41 22 338 99 78

Form PCT/IB/304 (October 2005)
**PCT**

**FIRST NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO DESIGNATED OFFICES WHICH DO NOT APPLY THE 30 MONTH TIME LIMIT UNDER ARTICLE 22(1))**

**Date of mailing (day/month/year) 05 July 2007 (05.07.2007)**

<table>
<thead>
<tr>
<th>Applicant's or agent's file reference</th>
<th>IMPORTANT NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF0670/PCT</td>
<td><strong>APPLICATION</strong></td>
</tr>
<tr>
<td><strong>PATENT COOPERATION TREATY</strong></td>
<td><strong>To:</strong></td>
</tr>
<tr>
<td></td>
<td>LEE, Kyeong-Ran</td>
</tr>
<tr>
<td></td>
<td>502 BYC Bldg., 648-1</td>
</tr>
<tr>
<td></td>
<td>Yeoksam 1-dong, Kangnam-ku</td>
</tr>
<tr>
<td></td>
<td>Seoul 135-081</td>
</tr>
<tr>
<td></td>
<td>RÉPUBLIQUE DE CORÉE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>International application No.</th>
<th>International filing date (day/month/year)</th>
<th>Priority date (day/month/year)</th>
</tr>
</thead>
</table>

| Applicant | HUMAX CO., LTD. et al |

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), does apply, please see Form PCT/IB/308 (Second and Supplementary Notice) (to be issued promptly after the expiration of 38 months from the priority date).

2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, does not apply, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:
   07 June 2007 (07.06.2007)

   **None**

   In accordance with Rule 47.1(c-bis)(i), those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, does not apply, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1:

   **CH, LU, SE, TZ, UG**

   In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

4. **TIME LIMITS for entry into the national phase**

   For the designated Office(s) listed above, and unless a demand for international preliminary examination has been filed before the expiration of 19 months from the priority date (see Article 39(1)), the applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be 20 MONTHS from the priority date.

   In practice, **time limits other than the 20-month time limit** will continue to apply, for various periods of time, in respect of certain of the designated Offices listed above. For regular updates on the applicable time limits (20 or 24 months, or other time limits), Office by Office, refer to the **PCT Gazette**, the **PCT Newsletter** and the **PCT Applicant's Guide**, Volume II, National Chapters, all available from WIPO's Internet site, at http://www.wipo.int/pct/en/index.html.

   It is the applicant's sole responsibility to monitor all these time limits.

---

**The International Bureau of WIPO**
34, chemin des Colombettes
1211 Geneva 20, Switzerland

**Authorized officer**

Philippe Becamel

Facsimile No. +41 22 338 82 70

Form PCT/IB/308(First Notice) (January 2004)
NOTIFICATION CONCERNING
AVAILABILITY OF THE PUBLICATION
OF THE INTERNATIONAL APPLICATION

Date of mailing (day/month/year)
07 June 2007 (07.06.2007)

Applicant's or agent's file reference
OPF0670/PCT

INTERNATIONAL APPLICATION

Applicant
HUMAX CO., LTD. et al.

The applicant hereby notified that the International Bureau:

☑ has published the above-indicated international application on 07 June 2007 (07.06.2007) under
No. WO 2007/064125

☐ has republished the above-indicated international application on under
No. WO
For an explanation as to the reason for this republication of the international application, reference is made to INID codes (15), (48) or (88) (as the case may be) on the front page of the published international application.

A copy of the international application is available for viewing and downloading on WIPO's website at the following address: http://www.wipo.int/pctdb (under "Query" enter the PCT or WO number).

The applicant may also request a paper copy of the published international application from the International Bureau by submitting a written request to PatentScope@wipo.int or to the address provided below.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Philippe Becamel

Facsimile No. +41 22 338 82 70

Form PCT/IB/311 (April 2006)
From the INTERNATIONAL SEARCHING AUTHORITY

To:
LEE, Kyeong-Ran
502 BYC Bldg., 648-1 Yeoksam 1-dong, Kangnam-ku, Seoul 135-081 Republic of Korea

---

**PCT**

**NOTIFICATION OF RECEIPT**

**OF SEARCH COPY**

(PCT Rule 25.1)

---

<table>
<thead>
<tr>
<th>Date of mailing</th>
<th>05 DECEMBER 2006 (05.12.2006)</th>
</tr>
</thead>
</table>

---

**Applicant's or agent's file reference**
OPF0670/PCT

---

**International application No.**
PCT/KR2006/005037

---

**International filing date**
28 NOVEMBER 2006 (28.11.2006)

---

**Priority date**
29 NOVEMBER 2005 (29.11.2005)

---

**Applicant**
HUMAX CO., LTD. et al

---

1. Where the International Searching Authority and the receiving Office are not the same Office:
The applicant is hereby notified that the search copy of the international application was received by this International Searching Authority on the date indicated below.

Where the International Searching Authority and the receiving Office are the same Office:
The applicant is hereby notified that the search copy of the international application was received on the date indicated below.

05 DECEMBER 2006 (05.12.2006)  
(date of receipt).

---

2. The search copy was accompanied by nucleotide and/or amino acid sequence listing or tables related thereto in electronic form.

---

3. The search copy contained a nucleotide and/or amino acid sequence listing or tables related thereto in electronic form.

---

4. **Time limit for establishment of international search report and written opinion of the International Searching Authority**
The applicant is informed that the time limit for establishing the international search report and the written opinion of the International Searching Authority is three months from the date of receipt indicated above or nine months from the priority date, whichever time limit expires later (Rules 42.1 and 43bis.1(a)).

---

5. A copy of this notification has been sent to the International Bureau and, where the first sentence of paragraph 1 applies, to the receiving Office.

---

Name and mailing address of ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer
COMMISSIONER

Telephone No. 82-42-481-5281

Form PCT/ISA/202 (April 2005)
PCT

INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

<table>
<thead>
<tr>
<th>Applicant's or agent's file reference</th>
<th>FOR FURTHER ACTION</th>
<th>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPF0670/PCT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International application No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCT/KR2006/005037</td>
<td>International filing date (day/month/year) (Earliest) Priority Date (day/month/year)</td>
<td></td>
</tr>
<tr>
<td>Applicant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUMAX CO., LTD. et al</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

[ ] It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report
   a. With regard to the language, the international search was carried out on the basis of :
      [x] the international application in the language in which it was filed
      [ ] a translation of the international application into ______________________ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. [ ] With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. [ ] Certain claims were found unsearchable (See Box No. II)

3. [ ] Unity of invention is lacking (See Box No. III)

4. With regard to the title,
   [x] the text is approved as submitted by the applicant.
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the abstract,
   [x] the text is approved as submitted by the applicant.
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,
   a. the figure of the drawings to be published with the abstract is Figure No. 2
      [x] as suggested by the applicant.
      [ ] because the applicant failed to suggest a figure.
      [ ] because this figure better characterizes the invention.
   b. [ ] none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (April 2005)
### A. CLASSIFICATION OF SUBJECT MATTER

**H04N 5/50(2006.01)**

According to International Patent Classification (IPC) or to both national classification and IPC.

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

- H04B, H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

- Korean Patents and applications for inventions since 1975
- Korean Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

- eKIPASS Search Terms: tuner, satellite

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WO 3085851 A (SONY CORP.) 16 October 2003 See abstract and page 1, line 4-page 7, line 2.</td>
<td>1-26</td>
</tr>
<tr>
<td>A</td>
<td>US 6272312 B (AKIRA TAKAYAMA ET AL) 7 August 2001 See abstract and column 1, line 13-column 3, line 10.</td>
<td>1-26</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

- See patent family annex.

Date of the actual completion of the international search

- **22 FEBRUARY 2007 (22.02.2007)**

Date of mailing of the international search report

- **23 FEBRUARY 2007 (23.02.2007)**

Name and mailing address of the ISA/KR

- **Korean Intellectual Property Office**
  - 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

- PARK, Jin Woo

Telephone No. 82-42-481-5765

Form PCT/ISA/210 (second sheet) (April 2005)
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>W003065851A1</td>
<td>16.10.2003</td>
<td>CN16566697A</td>
<td>17.08.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP01494362A1</td>
<td>05.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP1494362A1</td>
<td>05.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP15304162</td>
<td>24.10.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP15324359</td>
<td>14.11.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2003304162A2</td>
<td>24.10.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2003324359A2</td>
<td>14.11.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR10200401066326</td>
<td>17.12.2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW226155B</td>
<td>01.01.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US2005122428AA</td>
<td>09.06.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W2003065851A1</td>
<td>16.10.2003</td>
</tr>
<tr>
<td>US06272312</td>
<td>07.08.2001</td>
<td>DE69817314C0</td>
<td>25.09.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP92914681</td>
<td>20.08.2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP11205172A2</td>
<td>30.07.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP11205172</td>
<td>30.07.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR1019990067799</td>
<td>25.08.1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW410508B</td>
<td>01.11.2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW410508A</td>
<td>01.11.2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US6272312A</td>
<td>07.08.2001</td>
</tr>
</tbody>
</table>
**PCT**

국제조사보고서 및 국제조사기관의 전제서가 작성되어 이를 승부함을 출원인에게 통지합니다.

조약 제19조의 규정에 의한 보정서 및 설명서의 제출

위항하는 경우 출원인은 국제출원의 정부의 병원을 보정할 수 있습니다.(조약규칙 46):

기간 보정서 제출기간은 등장국제조사보고서 승부일부터 2월.

제출처 International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Faxcimile No.: +41 22 338 82 70

보다 자세한 지침에 대해서는 첨부되는 용지에 기재된 설명서를 참조.

1. □ 국제조사보고서가 작성되지 아니할 것이며 조약 제17조(2)(α)의 규정에 의한 신청서 및 국제조사기관의 전제서가 승부함을 출원인에게 통지합니다.

2. □ 국제조사보고서가 작성되지 아니할 것이며 조약 제17조(2)(β)의 규정에 의한 신청서 및 국제조사기관의 전제서가 승부함을 출원인에게 통지합니다.

3. □ 조약규칙 40.2의 규정에 의한 추가수수료 납부에 대한 이의신청과 관련하여 아래 사항을 출원인에게 통지합니다.

   ■ 이의신청 및 이의신청에 대한 결정 통지서를 출원인이 제출한 이의신청 및 이의신청에 대한 결정 통지서의 지정환경과의 승부 신청서와 함께 국제사무국에 승부하였습니다.

   ■ 이의신청에 대한 결정이 아직 이루어지지 않았습니다; 결정이 이루어지는 데로 출원인에게 통지할 것입니다.

4. 주의사항

우선일부터 18일 만료일후 국제사무국은 국제출원을 공개합니다. 공개를 하지 않거나 또는 연기할 것을 희망하는 경우에는 출원인은 국제공개의 기술적 준비가 완료되기 전에 각각의 경우에 따라 조약 규정 90bis.1 및 90bis.3의 규정에 의한 국제출원 취소 또는 우선권무효 취소서를 국제사무국에 제출하여야 합니다.

출원인은 비공식적으로 국제조사기관의 전제서에 대한 의견서를 국제사무국에 제출할 수 있다. 국제사무국은 국제 에비미사보고서가 작성되지 아니했거나 작성되지 아니한 예정인 경우 해당 의견서의 사본을 모든 지정환경에 승부함이 된다. 당해 의견서는 공중에 이용가능하게 될 것이며, 우선일부터 30일 만료 전에는 그러하지 아니하다.

일부 지정환경에 대하여는 출원인이 우선일부터 30일까지 (일부경관에 대하여는 더 높은 수도 있음) 국내단계개 또는 개 시를 연기하고자 하는 경우에 우선일부터 19일동안 국내에 의한 의견서를 제출하여야 합니다; 그렇게 하지 않은 경우 출원 인 우선일부터 20일 넘어 당해 지정환경에 대한 국내단계개의 개시를 위한 규정된 결과를 갖추어야 합니다.

다른 지정환경에 대하여는, 우선일부터 19일 이내에 국제에비미사가 정부하지 않더라도 30일(또는 더 늦을 수도 있음)의 기간이 적응될 것입니다.

서식 PCT/IB/301의 부속서류를 참조하기 바라며, 다음과서 참조하십시오. 그외의사항은 PCT출원인 단계 제2장 국내단계개 및 WIPO 인터넷 사이트를 참조하시기 바랍니다.

---

**ISA/KR의 명칭 및 우편주소**

대한민국 특허청
302-701 대한민국 대전광역시 서구 문산동 920번지 정부대청사

**특허청장**

패스 번호 82-42-472-7140
전화번호 82-42-481-5281

서식 PCT/ISA/220 (2005년 10월)
서식 PCT/ISA/220에 대한 설명 (NOTE)

이 설명은 조약 제19조의 규정에 의한 보전에 관한 기본적인 안내입니다. 이는 특히 협력조약, 조약규칙 및 조약手続き에 의한 요건에 기초하고 있습니다. 이 설명과 앞서 언급된 요건 사례에 상이점이 있는 경우에는 후자가 적용됩니다. 보다 자세한 정보에 대해서는 WIPO 발행 PCT 출원인 안내를 참조.

이 설명에서 "조약", "조약규칙" 및 "조약手続き"이라 함은 각각 특허협력조약, 특허협력조약에 의한 시 행규칙 및 특허협력조약에 의한 시 행제도를 말합니다.

조약 제19조의 규정에 의한 보전에 관한 안내

국제조사보고서 및 국제조사기관의 건설을 수명한 후 출원인은 1개월에 한하여 국제출원의 청구서를 범위로 보전할 기회를 가집니다. 국제출원의 모든 부분(청구서의 범위, 명세서 및 도면)은 국제에비시사 결과 동안에 보전이 가능함으로, 예를 들어 출원인이 가보호(provisional protection)을 위하여 조약 제19조의 규 정에 의한 보전이 공개 될 것을 회망하는 경우 또는 국제공개전에 청구서의 범위를 보상할 다른 이유가 있는 경우를 제외하고는 통상 조약 제19조의 규정에 의한 보전을 할 필요는 없습니다. 또한 가보호는 일부국가 에서만 가능할 수 있도록 합니다.(PCT출원인안내, 부록 B1 및 B2 참조).

조약 17(2)조의 규정에 의하여 국제조사기관이 국제조사보고서가 작성되지 않은 것을 선언할 경우, 조약 제19조에 근거한 청구범위의 보전을 할 수 없음을 주의하시기 바랍니다.(PCT출원인안내, 296쪽)

국제출원의 어느 부분을 보전할 수 있는가?
조약 제19조의 규정에 의하여 청구서의 범위만을 보전할 수 있습니다.

국제단계 중에는 조약 제34조의 규정에 의하여 국제에비시사기관에 대하여 청구서의 범위를 보전(추가 보전 가능)할 수 있습니다. 명세서 및 도면은 조약 제34조의 규정에 의하여 국제에비시사기관에 대하여만 보전(추가 보전 가능)할 수 있습니다.

국제단계를 개시할 때 국제출원의 모든 부분은 조약 제28조 또는 제41조(해당하는 경우)의 규정에 의하여 보전할 수 있습니다.

기간은? 국제조사보고서 수송일부터 2개월 또는 우편일부터 16개월 중 늦게 만료하는 날, 다만, 기간 만료 후 국제공개의 기술적 준비가 완료되기 전에 국제사무국에 보고서가 수리된 경우에는, 기간내에 수리된 것으로 봅니다.(조약규칙 46.1).

보전서를 제출하지 않아야 할 곳은?
보전서는 수리완료 또는 국제조사기관이 아니면 국제사무국에 제출하여야 합니다.(조약규칙 46.2).

국제에비시사청구서가 제출된 경우에는 아래 참조.

방법은? 1 또는 2이상의 청구항 전부의 제목, 1 또는 2이상의 새로운 청구항의 추가 또는 1또는 2이상의 출원일 청구항의 변경을 통하여 이루어집니다.

보전에 의하여 최초 출원일의 용지와 달라지는 청구항의 각 용지에 대하여는 대체용지를 제출하여야 합니다.

대체용지상의 모든 청구항은 아라비아 숫자로 번호를 부여하여야 합니다. 청구항이 삭제된 경우에는 그 청구항에 대하여 번호를 다시 부여할 필요는 없습니다. 번호를 다시 부여한 경우에는 항상 연속된 번호를 부여해야 합니다(조약사례론 205(b)).

보전서는 당해 국제출원의 공개연어로 하여야 합니다.

보전서에 수반되는/수반되어야 하는 서류는?
서류 제205(b): 보전서는 서류와 함께 제출하여야 합니다. 서류는 국제출원 및 보전된 청구서의 범위와 함께 공개되지 않습니다. 서류는 "조약 제19조의 규정에 의한 설명서"와 헌드서는 안됩니다(아래 "조약 제19조의 규정에 의한 설명서" 참조).

서류는 출원인이 선택에 따라 영어 또는 붐어로 작성하여야 합니다. 다만, 국제출원연어가 영어인 경우에는 영어로, 국제출원연어가 붐어인 경우에는 붐어로 작성하여야 합니다.

서식 PCT/ISA/220에 대한 설명(제1장지) (2005년 10월)
서식 PCT/ISA/220에 대한 설명(계속)

서면에는 출원시의 청구의 범위 및 보정된 청구의 범위 사이의 상이점에 대하여 기재하여야 합니다. 

(i) 청구항이 변경되었는지
(ii) 청구항이 삭제되었는지
(iii) 청구항이 새로운 것인지 
(iv) 청구항이 출원시의 1 또는 2이상의 청구항을 대체하는지 
(v) 청구항이 출원시의 청구항의 분할인지

여부를 국제출원의 각 청구항과 연관하여 (몇몇의 청구항에 관한 동일한 기간은 둘어서 하실 수 있습니 다) 기재하여야 합니다.

다음의 예는 서면에서 보정을 설명하는 방식을 나타냅니다.

1. "[회초에 48개의 청구항이 있었으나 일부 청구항을 보정하여 51개의 청구항이 있는 경우]: 
   "Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33, and 36 unchanged; new claims 49 to 51 added."
2. "[회초에 15개의 청구항이 있었으나 모든 청구항을 보정하여 11개의 청구항이 있는 경우]: 
   "Claims 1 to 15 replaced by amended claims 1 to 11."
3. "[회초에 14개의 청구항이 있었으나 일부 청구항을 삭제하고 새로운 청구항을 추가하는 경우]: 
   "Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." 또는 
   "Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. "[다양한 보정이 있는 경우]:
   "Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"조약 제19조(1)의 규정에 의한 설명서"(조약규칙 46.4)

보고서에는 보정내용을 설명하고 당해 보정이 명확히 의뢰된 대로(조약 제19조(1)의 규정에 의하여 보정이 불가)에 미치는 영향을 기재한 설명서를 첨부할 수 있습니다.

보고서는 국제출원 및 보정된 청구의 범위와 함께 공개됩니다. 

보고서는 당해 국제출원의 공개요건으로 작성하여야 합니다. 

보고서는 불가 복제하여야 하며 영어 또는 영어로 번역한 경우 500단어를 넘지 않아야 합니다. 

보고서는 최초 출원시의 청구의 범위와 보정된 청구의 범위 사이의 차이점에 대하여 기재한 서면과 

조약 중단에서는 아니되며 또한 설명서가 당해 서면을 대체하지도 않습니다. 설명서는 별도의 움직이 제 

출여야 하며, 제목을 기재하여 구별하되 그 제목은 "조약 제19조(1)의 규정에 의한 설명서"로 기재하 

는 것이 좋습니다.

보고서에는 국제조사보고서 또는 당해 보고서에 포함된 인용문헌의 관련성에 대하여 비방하는 의견을 

기재하여야 합니다. 이런 청구항에 관련된 것으로서 국제조사보고서에 포함되어 있는 인용문헌에 

대해서는 당해 청구항의 보정과 관련해서만 언급할 수 있습니다.

국제예비심사청구서가 이미 제출된 경우의 결과

조약 제19조 규정에 의한 보정서 및 설명서의 제출시에 이미 국제예비심사청구서가 제출되어 있는 

경우에는 가능할 출원인은 국제특허국에 보정서(및 설명서)를 제출함과 동시에 국제예비심사기관에 

도 당해 보정서의 사본(및 설명서의 사본) 및 해당하는 경우에는 당해 기관에서의 결과를 위한 보정 

서의 변역문을 제출하여야 합니다(조약규칙 55.3(a) 및 62.2 절 변역 문장 참조). 추가적인 정보는 

demand form(PCT/EPA/A01)에 대한 설명을 참조.

국제예비심사청구서가 정구되면, 국제예비심사기관이 국제조사기관으로서의 역할을 하지 않았고 당해 예비 

심사기관이 국제특허국에 조약규칙 66.1(b)(b)의 규정에 의한 종류를 한 경우를 제외하고, 국제조사기관 

의 전서는 국제예비심사기관의 전서로 간주된다. 국제예비심사청구가 이루어진 경우 출원인이 

국제예비심사기관에 보정서(해당하는 경우)와 함께 전서에 대한 답변을 제출할 수 있다. 중 제출기간 

은 서식 PCT/ISA/220의 발송일부터 3일 또는 우편일부터 22일 중 높게 만료하는 날 전까지이다 

(조약규칙 43bis(c)).

국내단계 개시를 위한 국제출원의 번역문에 관한 결과

출원인은 국내단계를 개시하는 경우 조약 제19조의 규정에 의하여 보정된 청구의 범위의 번역문을 회 

초의 청구의 범위의 번역문과 함께 또는 당해 번역문을 대신하여 서면/선택판정에 제출하여야 하는 경 

우가 있다는 사실을 기재해야 합니다.

각 지정/선택판정의 요건에 관한 보다 자세한 사항은 PCT 출원인 안내, 제2권 참조.

서식 PCT/ISA/220에 대한 설명(제2유지) (2005년 10월)
PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
LEE, Kyeong-Ran
502 BYC Bldg., 648-1 Yeoksam 1-dong, Kangnam-ku, Seoul 135-081 Republic of Korea

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing (day/month/year) 23 FEBRUARY 2007 (23.02.2007)

Applicant's or agent's file reference
OPF0670/PCT
FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/KR2006/005037
International filing date (day/month/year) 28 NOVEMBER 2006 (28.11.2006)
Priority date (day/month/year) 29 NOVEMBER 2005 (29.11.2005)

International Patent Classification (IPC) or both national classification and IPC
H04N 5/50(2006.01)i

 Applicant
HUMAX CO., LTD. et al

1. This opinion contains indications relating to the following items:
   - Box No. I Basis of the opinion
   - Box No. II Priority
   - Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - Box No. IV Lack of unity of invention
   - Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - Box No. VI Certain documents cited
   - Box No. VII Certain defects in the international application
   - Box No. VIII Certain observations on the international application

2. FURTHER ACTION
   If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

   If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
   For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Date of completion of this opinion 22 FEBRUARY 2007 (22.02.2007)
Authorized officer PARK, Jin Woo
Telephone No.82-42-481-5761

Form PCT/ISA/237 (cover sheet) (April 2005)
Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
   ☒ the international application in the language in which it was filed
   ☐ a translation of the international application into ________________, which is the language of a
     translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the
   claimed invention, this opinion has been established on the basis of:
   a. type of material
      ☐ a sequence listing
      ☐ table(s) related to the sequence listing
   b. format of material
      ☐ on paper
      ☐ in electronic form
   c. time of filing/furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been
   filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that
   in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:
1. Statement

| Novelty (N) | Claims | YES |
| Inventive step (IS) | Claims | NO |
| Industrial applicability (IA) | Claims | NO |

2. Citations and explanations:

Reference is made to the following documents:
D1: WO 3085851 A (SONY CORP.) 16 October 2003
(See abstract and page 1, line 4—page 7, line 2)
D2: US 6272312 B (AKIRA TAKAYAMA ET AL) 7 August 2001
(See abstract and column 1, line 13—column 3, line 10)

1. Novelty and Inventive step

D1 discloses a reception device including a plurality of tuners for receiving broadcasts such as a satellite broadcast.

D2 discloses a satellite broadcasting receiving tuner for receiving digital system satellite broadcasting.

Claims 1–13 of the present application relate to a method of setting a tuner connection state of n satellites, comprising: setting the tuner connection state for each satellite; and setting the tuner connection state of the tuners among the satellites.

Claims 14–26 of the present application relate to a digital broadcast receiver, including a processor, setting a tuner connection state corresponding to N satellites by use of a satellite signal inputted through the tuner, whereas the processor sets a connection state of the tuner for each satellite, and then sets a tuner connection state among the satellites.

Neither D1 nor D2 discloses the technical feature of setting the tuner connection state for each satellite or setting the tuner connection state of the tuners among the satellites. Therefore, the subject matter of the present invention is considered to be novel and to involve an inventive step under PCT Articles 33(2)–(3).

2. Industrial Applicability

The present invention can be used in the broadcasting industry. Therefore, the present invention is considered to be industrially applicable under PCT Article 33(4).
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 METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER, the specification of which

☐ is attached hereto    ☐ was filed on ______________ as Application Serial No. ___________ 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 all information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the international or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365 (b) of any foreign application(s) for patent or inventor’s certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor’s certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

<table>
<thead>
<tr>
<th>Prior Foreign Application(s):</th>
<th>Foreign Filing Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Country</td>
</tr>
<tr>
<td>10-2005-0114502</td>
<td>Korea</td>
</tr>
<tr>
<td>10-2006-0112126</td>
<td>Korea</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Application Number(s):</th>
<th>Filing Date (Month/Day/Year)</th>
</tr>
</thead>
</table>

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 all 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.

<table>
<thead>
<tr>
<th>Prior U. S. Application or PCT Parent Number</th>
<th>Filing Date (Month/Day/Year)</th>
<th>Parent Patent Number (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT/KR2006/005037</td>
<td>November 28, 2006</td>
<td></td>
</tr>
</tbody>
</table>

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application 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
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Jun-Hyung KIM; Ho YI and Min-Haeng CHO

Serial No.: National Stage Application of International Application No. PCT/KR2006/005037

International Filing Date: November 28, 2006
U.S. National Stage Filing Date: May 20, 2008

For: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

INFORMATION DISCLOSURE STATEMENT

U.S. Patent and Trademark Office
Customer Service Window, BOX PCT
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 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 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 materials 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 US. 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(c)(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(e) 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(d)(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 or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(d)(2).


☒ 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: May 20, 2008

Please direct all correspondence to Customer Number 34610

DYK/dak
\\Fkt\Documents\2309\2309-007\159753.doc
# LIST OF ART CITED BY APPLICANT

(PTO-1449)

### U.S. PATENT DOCUMENTS

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>*PATENT NO.</th>
<th>*ISSUE DATE</th>
<th>*INVENTOR NAME</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>FILING DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,272,312 B1</td>
<td>08/07/2001</td>
<td>Takayama et al.</td>
<td>455</td>
<td>3.02</td>
<td>01/08/1999</td>
</tr>
</tbody>
</table>

### U.S. PATENT APPLICATION PUBLICATIONS

<table>
<thead>
<tr>
<th>*PATENT APPLN. PUB. NO.</th>
<th>*PUB. DATE</th>
<th>*APPLICANT</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

### U.S. PATENT APPLICATIONS

<table>
<thead>
<tr>
<th>*APPLN. NO.</th>
<th>*FILING DATE</th>
<th>*INVENTOR</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

### FOREIGN PATENT DOCUMENTS

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>PATENT NO.</th>
<th>DATE</th>
<th>COUNTRY</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WO 03/085851 A1</td>
<td>10/16/2003</td>
<td>WIPO (English Abstract and Japanese Full Text)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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

(19) 世界知的所有権局
国際事務局

(43) 国際公開日

(51) 国際特許分類: H04B 1/08, H04N 5/44, H05K 3/46

(21) 国際出願番号: PCT/JP03/04238

(22) 国際出願日: 2003年4月2日 (02.04.2003)

(25) 国際出願の言語: 日本語

(26) 国際公開の言語: 日本語

(30) 優先権データ:

(71) 出願人/出願者: ソニー株式会社 (SONY CORPORATION) [JP/JP]; 〒141-0001 東京都品川区北品川5丁目7番35号東京 (JP).

(72) 発明者: および
(74) 代理人: 小池晃, 秀高 (KOIKE,Akira et al.); 〒100-0011 東京都千代田区永田町一丁目1番7号大和生命ビル11階東京 (JP).

(54) Title: SIGNAL RECEPTION DEVICE, SIGNAL RECEPTION CIRCUIT, AND RECEPTION DEVICE

(54) 発明の名称: 信号受信装置, 信号受信回路及び受信装置

(57) Abstract: A reception device including a plurality of tuners for receiving broadcast such as a satellite broadcast. A tuner circuit (1) includes an input terminal (11) into which a broadcast wave of a video signal and/or audio signal modulated into a predetermined format is input and a mount layer (13) having a main circuit for selecting a video signal and/or audio signal contained in a predetermined frequency band from the broadcast wave. A first ground layer (15) is provided via a first dielectric layer (14) on the surface of the mount layer (13) not having the main circuit (12) and a second ground layer (17) is provided via a second dielectric layer, thereby suppressing interference between the plurality of tuners.

(57) 要約: 衛星放送等の放送を受信する複数のチューナを備える受信装置であり、映像信号及び／又は音声信号を所定形式で変調した放送波が入力される入力端子（11）と、放送波から所定の周波数帯域に含まれる映像信号及び／又は音声信号を選択するためのメイン回路（12）が配置されたマウント層（13）とを有するチューニング回路（1）におけるマウント層（13）のメイン回路（12）が記載される面の反対面に第1の誘電体層（14）を介して第1のグランド層（15）を備え、さらに第2の誘電体層を介して第2のグランド層（17）を備えることににより、複数のチューナ間の相互干渉

/続葉有/
(81) 指定国 (国内): CN, KR, US.

(84) 指定国 (広域): ヨーロッパ特許 (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR).

添付公開書類:
— 国際調査報告書

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。
明細書

信号受信装置、信号受信回路及び受信装置

技術分野

本発明は、信号受信装置及び信号受信回路に関し、特に、少なくとも一の放出波を複数の受信回路にて受信し、或いは、複数の放出波をこれに対応した個々の受信回路にて受信する信号受信装置及びこの信号受信装置に適用して有用な信号受信回路に関し、更に、複数のチューナを内蔵する受信装置に関する。

本出願は、日本国において2002年4月8日に出願された日本特許出願番号2002-104756及び2002年4月26日に出願された日本特許出願番号2002-127415を基礎として優先権を主張するものであり、これらの出願は参照することにより、本出願に援用される。

背景技術

映像や音声をデジタルデータとして扱う装置が普及しつつあり、テレビジョン放送もデジタル化が図られている。デジタル放送では、アナログ放送に比べて多チャンネル化が可能になるとともに、映像及び音声信号と同時に配信される番組情報等によって、様々な機能を付加することができる。

例えば、デジタル衛星放送電波、デジタル地上波放送電波等を受信できる受信装置の中には、複数のチューナ回路を持ち、これらを同時に動作させることによって、通常のように放送番組をタイムリーに視聴できるようにするとともに、ランダムアクセス可能な記録媒体、例えばHDD (Hard Disc Drive) 等に保存し、放送番組を視聴中であっても直前の映像を適宜再生できるようにした機能を備えたものもある。

この場合、複数のチューナ回路を同時に使用することに起因する高周波の相互干渉が問題となる。すなわち、複数のチューナ回路は、互いに独立したパラボラ
アンテナから、同一周波数であってもレベル差が付いた信号を受信する状態にある。このとき、各々のチューナ回路には、高周波電流が流れており、チューナ回路の周囲に発射電磁波による電界や磁界を発生させている。

複数のチューナの各々は、いわゆるセットトップボックス（STB）の背面パネル側に主として取り付けられることが多いために、チューナ間で十分な空間距離を確保できないことが多い。そのため、複数のチューナ回路の各々から発生する磁界及び電界が互いに他のチューナ回路に影響を及ぼし、同一チャンネル混信状態に陥る可能性があるった。

この種のチューナ回路51、52の具体的な構成を図1に示す。各チューナ回路51、52を構成する基板61は、マウント層62とグランド層63とを用いたいわゆるマイクロストリップライン構成に準じて設計されているため、マウント層62側には、高周波電流が多く流れる。このような構成では、特に、図1に示すように、2つのチューナ回路51、52を並設して使用するような場合、マウント層62上の回路群64から隣のチューナ回路52に向かって高周波電流による電磁波が放射される。グランド層63に向かっても容積結合した誘電体層65を経由して高周波電流が流れる。

なお、図1において、61、61は各チューナ回路51、52の入力端子である。

このような問題点を回避するために、セットトップボックス内にケーブルを配置して複数のチューナユニットの配置に所定の空間を持たせたり、金属部品を加工したシールドケース66、67を用いて各チューナユニットを厳重に覆って、電界及び磁界を遮蔽するなどの対策を施している。

また、デジタル衛星放送の受信装置として、例えば図2に示すように、2系統の受信系と番組の割当用のデバイスを内蔵するものが考えられている。この受信装置は、第1のアンテナ71によりデジタル衛星放送が受信されることとともに、中間周波数信号にダウンコンバートされる。この中間周波数信号は、受信装置80の第1のチューナ81に供給されてベースバンド信号に変換されるとともに、複調及び誤り訂正などの処理が行われることにより第1のTS（トランスポートストリーム）として出力される。このTSは、切換回路83に供給される。
第2のアンテナ72により第2のデジタル衛星放送が受信されるとともに、中間周波数信号にダウンコンバートされる。この中間周波数信号は、第2のチューナ82に供給される。第2のチューナ82は、中間周波数信号に対し第1のチューナ81と同様の処理を施し第2のTSを出力する。第2のTSは切断回路83に供給される。

切断回路83には、番組の蓄積用のデバイスとして、HDD84が接続され、ユーザの操作にしたがって、第1のチューナ81から出力されるTSと、第2のチューナ82から出力されるTSとのいずれか一方が記録（蓄積）される。

切断回路83から、ユーザの操作にしたがって、第1のチューナ81、第2のチューナ82から出力されるTS及びHDD84から読み出されるTSのうちのいずれか一つのTSが選択されて取り出され、この取り出されたTSがMPEGデコーダ85に供給されてデジタルビデオ信号及びデジタルオーディオ信号にデコードされる。

デコードされたデジタルビデオ信号が例えばNTSCエンコーダ回路86に供給されてNTSC方式におけるデジタルビデオ信号にエンコーダされ、この信号がD／Aコンバータ回路87Vに供給されてアナログのNTSCビデオ信号がD／A変換されて出力端子88Vから出力される。MPEGデコーダ85によりデコードされたデジタルオーディオ信号がD／Aコンバータ回路87Sに供給されて元のアナログオーディオ信号にD／A変換され、出力端子88Sから出力される。

システム制御回路89は、マイクロコンピュータを有し、ユーザの操作にしたがってシステム制御回路89からそれぞれの回路に制御信号を供給する。

第1のチューナ81、第2のチューナ82は、例えば図3及び図4に示すように構成される。すなわち、第1及び第2のチューナ81、82は、同様に構成され、矩形状をなす両面プリント基板91の一方の面及び他方の面にICなどの各種の部品92、93が実装されている。プリント基板91の高周波部分を囲むように、枠状のシールド板94、95が設けられるとともに、これらシールド板94、95は、皿状のシールド蓋96、97によって覆われている。なお、図3では、シールド蓋96をはずした状態を示している。
プリント基板の一方の短辺及び長辺には、アンテナ入力コネクタ98及びコネクタピン99がプリント基板91と平行する向きに設けられている。

以上のように構成された第1及び第2のチューナ81、82は、図4に示すように、互いに平行に且つコネクタ98、99が受信装置80の後面パネル301から突出するようにメインのプリント基板302に設けられている。このとき、プリント基板302には、図示しないが、2つのコネクタが設けられ、これらコネクタに第1及び第2のチューナ81、82のコネクタピン99、99が差し込まれる。これにより、第1及び第2のチューナ81、82は、プリント基板302に接続される。

この受信装置80によれば、第1、第2のチューナ81、82の一方が受信した放送のビデオ信号及びオーディオ信号を出力端子88V、88Sに出力してその放送を聴取することができる。このとき、その聴取中の番組をHDD84に録画したり、裏番組を第1、第2のチューナ81、82の他方により受信してHDD84に録画したりして聴取することができる。また、HDD84に録画した番組を聴取することもできる。

ところで、上述したように、チューナユニットをシールドケース等を用いてシールドすると、部品点数が増加し製品のコストアップとなる。さらに、シールドケースを設けると、基板間にシールドケースを設ける空間が必要となり、チューナユニットをセットトップボックス内に効率よく配置することができなくなる。

また、シールドケース内側の空間に発生する電界及び磁界によって、ケース表面にも高周波電流が流れめるため、実際は配置位置次第でシールドケースを伝播した高周波電流が他方のチューナ回路に対して影響を与える相互干渉を引き起こすおそれがある。

また、第1及び第2のチューナ81、82が、図3及び図4に示すように構成されている場合には、第1のチューナ81と第2のチューナ82とが近接していると、第1のチューナ81からの不要干渉が第2のチューナ82に飛び込んだり、逆に第2のチューナ82から不要干渉が第1のチューナ81に飛び込んだりすることにより、相互干渉が発生してしまう。その結果、双方のチューナ81、82から出力されるTSのビットエラー率などが悪化し、性能の低下を招いてしまう。
このため、第1及び第2のチューナ81、82は、上述のようにそれらの高周波部分をシールド板94、95及びシールド蓋96、97によりそれぞれ密閉し、第1のチューナ81と第2のチューナ82とを近接して配置しても相互干渉が生じないようにしている。

第1及び第2のチューナ81、82のそれぞれに2組のシールド板94、95及びシールド蓋96、97を設けると、シールド部材が増加するので、部品点数が増加し、製品のコストアップを招いてしまう。

第1のチューナ81と第2のチューナ82とを十分に離間してメイン基板302に配置することにより、各チューナ81、82の相互干渉を低減することができるが、このような構成を採用すると、2つのコネクタ98、98の間隔が大きくなってしまい、受信装置80の操作性が悪化するばかりか、外観のデザインも現実的でなくなってしまう。

発明の開示

本発明の目的は、上述したような従来の受信装置が有している問題点を解消し得る新規な信号受信装置及び信号受信回路を提供することにある。

本発明の他の目的は、簡単な構造により複数のチューナが同時に動作する際に発生する相互干渉を低減する信号受信装置及び信号受信回路を提供することにある。

本発明のさらに他の目的は、複数のチューナを内蔵する受信装置において、不要電磁波による性能劣化を低減し、しかも、製造コストの低減を図ることができると信号受信装置及び信号受信回路を提供することにある。

上述した目的を達成するために提案される本発明に係る信号受信装置は、映像信号及び／又は音声信号を所定形式で変調してなる放射波を入力する入力手段と、放射波から所定周波数帯域に含まれる映像信号及び／又は音声信号を選択し復調するための回路が配置されたマウント層と、マウント層の回路が配置される回路配設面の反対面に該マウント層と所定間隔をおいて設けられた複数のグランド層とが所定の間隔をおいて積層された信号受信手段を複数備える。
士は、ある信号受信手段の最下層に位置するグランド層と別の信号受信手段の回路配設面とが対向するように配置され、選択され復調された周波数帯域の映像信号及び／又は音声信号を復号する復号手段と、復号された映像信号及び／又は音声信号を外部機器へと出力する出力手段とを備える。

本発明に係る信号受信装置においては、複数設けられた信号受信手段間で高周波の放射波によって生じる相互干渉による不具合が低減される。

ここで、特に、マウンテン層と最上位に位置するグランド層との間、及び各グランド層の間には、誘電体層を設けることが好ましい。また、信号受信手段は、一の放射波に対して複数設けられている場合でもよいし、複数の放射波の各々に対応する個数設けられている場合であってもよい。

本発明に係る信号受信回路は、映像信号及び／又は音声信号を所定形式で変調してなる放射波を入力し入力手段と、放射波から所定周波数帯域に含まれる映像信号及び／又は音声信号を選択し復調するための回路が配置されたマウンテン層と、マウンテン層の回路が配置される面の反対面に該マウンテン層と所定間隔をおいて設けられた複数のグランド層とを備え、マウンテン層と複数のグランド層とは、所定の間隔をおいて積層されている。本発明に係る信号受信回路では、それぞれを並設した際に高周波の放射波によって生じる相互干渉による不具合が低減される。

ここで、特に、マウンテン層と最上位に位置するグランド層との間及び各グランド層の間には、誘電体層を設けることが好ましい。

本発明に係る受信装置は、少なくとも第1及び第2のチューナーを備える。第1のチューナ及び第2のチューナは、両面プリント基板及び所定の部品をそれぞれ備える。両面プリント基板は、その一方の面が部品の実装面とされ、他方の面のほぼ全領域が接地面とされ、第1のチューナの両面プリント基板の実装面と、第2のチューナの両面プリント基板の実装面とは対称とされている。第1及び第2のチューナの両面プリント基板は、接地面が互いに対向するように装置内部に配置される。

第1及び第2のチューナの両面プリント基板は、それらの接地面により互いにシールドされ、それぞれの不要幅射が抑制される。
本発明の更に他の目的、本発明によって得られる具体的な利点は、以下において図面を参照して説明される実施の形態の説明から一層明らかにされるであろう。

図面の簡単な説明

図1は、従来のチューナ回路基板のセットトップボックス内における配置を説明する図である。
図2は、本発明が適用される受信装置を示すブロック図である。
図3は、チューナを構成するプリント基板を示す平面図である。
図4は、第1及び第2のチューナを受信装置内に配置した状態を示す側面図である。
図5は、本発明を適用したチューナ回路基板の側面図である。
図6は、チューナ回路のIC部を示すブロック図である。
図7は、図6に示すチューナ回路を等価回路で示した図である。
図8は、従来のチューナ回路を等価回路で示した図である。
図9は、チューナ回路を実装したセットトップボックスの一例を説明するブロック図である。
図10は、セットトップボックスにおけるチューナ回路基板の配置を説明する図である。
図11は、チューナ回路にDVB-Sを流した際に隣接するチューナ回路で検出される干渉波の信号レベルとこのDVB-S信号レベルとの関係を説明する特性図である。
図12Aは第1のチューナを示す平面図であり、図12Bは第2のチューナを示す平面図である。
図13は、第1及び第2のチューナを受信装置内に配置した状態を示す側面図である。

発明を実施するための最良の形態
以下、本発明を、本発明を適用したチューナ回路及びこのチューナ回路を含む信号受信装置を図面を参照して詳細に説明する。

図5は、本発明を適用したチューナ回路1の基板面を示す側面図である。チューナ回路1は、信号受信のための回路が多層基板上にマイクロストリップライン構成に準じて設計された回路基板であって、所定形式で変調されて送信される放送波を受信し、変調する。ここに示すチューナ回路1は、例えば、デジタル衛星放送（Digital Video Broadcasting － Satellite；DVB－S）を受信するための回路構成を備えている。

チューナ回路1は、映像信号及び／又は音声信号を所定形式で変調してなる放送波を入力する入力端子1と、放送波から所定周波数帯域に含まれる映像信号及び／又は音声信号を選択するためのメイン回路12が配置されたマウント層13を有している。マウント層13のメイン回路12が配設される面の反対に第1の誘電体層14を介して第1のグランド層15を備えている。チューナ回路1は、第2の誘電体層16を介して第2のグランド層17を備えている。

メイン回路12には、直流成分をカットするためのコンデンサ18と、バイアス電圧を生成するための抵抗器19が含まれており、入力された放送波は、これらコンデンサ18と抵抗器19を介してIC20に伝送される。

具体的にIC20は、図6に示すように、入力端子21と、入力した放送波を増幅する増幅器22と、ゲインを調整するAGC（オートゲインコントローラ）23と、中间周波数を取り出すためのBPF（バンドパスフィルタ）24と、さらに中间周波数からI成分とQ成分を取り出すためのZero－IF25と、I成分及びQ成分から入力した放送波を変調するQPSK変調回路26を備えている。これにより、入力端子11から取り込まれた所定形式で変調された放送波は、トランスポートストリーム（Transport Stream；TS）に変調される。

図7は、マウント層13、誘電体層14、16、グランド層15、17との間の容量結合の様子を等価回路として示したものである。電磁界の幅射源となるマウント層13に対して、反対面に位置する第2のグランド層17には、第1のグランド層15が介在するために、2つの容量を介して幅射源となり得るグランド層17に結合していることになる。
図7に示すように、2層のグランド層とその間に誘電体層を設けることにより、基板層内における容量値は、2つのコンデンサの直列容量となるため、各々の層間の結合度が同じであれば多層基板とすることによって、図8に示す等価回路と比較して実質的な容量を1/2に低減できる。

したがって、以上説明した構成を備えたチューナ回路1は、マウント層１３、第１のグランド層１５、第２のグランド層１７を備え、また、マウント層１３と第１のグランド層１５の間、及び第１のグランド層１５と第２のグランド層１７との間に第１の誘電体層１４、第２の誘電体層１６をそれぞれ設けることによって、コンデンサ１８、抵抗器１９、及びＩＣ２０から第１のグランド層１５に到達する高周波電流を第２の誘電体層１６と第２のグランド層１７とで遮蔽できるため、第２のグランド層１７から放射される高周波信号のレベルを効率的に低減できる。

続いて、上述したチューナ回路1を実装したセットトップボックス30について図9を参照して説明する。図9に示すセットトップボックス30は、第1及び第2のチューナ回路1、2を並設しており、同一周波数でありながらレベル差が付いた信号を受信することができる。なお、第1及び第2のチューナ回路1、2は、実質的に同一の構成を備えるものであり、両者は区別することなく使用できる。第2のチューナ回路2を構成する各部を第1のチューナ1の各部と区別するため、第2のチューナ2の各部を示す番号に「a」を付す。

セットトップボックス30は、第1及び第2のチューナ回路1、2からのトランスポートストリームを入力してデマルチフレクスし、映像、音声、データ等を分離するDEMUX(Demultiplexer)31と、DEMUX31により取り出されたMPEG(Moving Picture Experts Group)形式に準拠した映像データ及び音声データを複数のMPEGデコーダ32と、画像処理回路33と、これら各部を統括管理するCPU34とを備えている。これらは、バスクイン35によって互いに接続されている。セッコンプトップボックス30は、映像データ及び音声データ等を記録するHDD36と、バスインターフェイス37とを備えている。

このセットトップボックス30において、第1及び第2のチューナ回路1、2は、DEMUX31の前段に設けられている。具体的には、図10に示すように、
第1のチューナ回路1の第2のグランド層17と第2のチューナ回路2のメイン回路12a側とが対向するように並設されている。
この対向する第2のチューナ回路2のマウント層13aに対向するグランド層17に発生するメイン回路12aからの放射もチューナ回路1のメイン回路12に到達しにくくできるため、干渉が起こりにくい。
このとき、実際に一方のチューナ回路でデジタル衛星放送波（Digital Video Broadcast - Satellite; D V B - S）信号を受信した際の、他方のチューナ回路において受信された信号レベルを調べた。その結果を図11に示す。
図11において、Aで示される挙動は、前述した図1に示した従来のチューナ回路において、同じ試験を行った際の結果である。Bで示される挙動は、第1及び第2のチューナ回路1、2を並設して構成したセットトップボックス30の場合である。
図11によって明らかのように、本発明が適用されたチューナ回路1によれば、複数のグランド層を設けることにより、隣接するチューナ回路間の放射を抑制できる。したがって、高周波電流成分によって生じる相互干渉が低減され、良好な受信特性が得られるといえる。
なお、本発明は、上述した例に限定されるものではなく、本発明の要旨を逸脱しない範囲において種々の変更が可能であることは勿論である。例えば、チューナ回路は、同周波数に対応したものに限定されない。例えば、複数の放送波に対応したチューナ回路をそれぞれ有していてもよい。
本発明の他の例を図12A、図12B及び図13を参照して説明する。
図12Aは、第1のチューナ81を示し、図12Bは、第2のチューナ82を示し、図13は、第1及び第2のを受信装置に実装した状態を示す側面図である。
第1のチューナ81においては、プリント基板210が例えば矩形状の両面基板とされるとともに、その一方の面81Aに配線パターンが形成されてICなどの各部品211が実装されている。プリント基板210の他方の面81Bは、そのほぼ全面に導電パターンが形成されるとともに、部品実装面81Aの接地パターンに接続されてほぼ全面が接地電位とされている。したがって、プリント基板210の他方の面81Bは、接地面とされている。プリント基板210の実装
面81Aには、その高周波部分を囲むように、枠状のシールド板212が設けられている。

プリント基板210の一方向の短辺及び長辺には、その部品実装面81Aに、アンテナ入力コネクタ218及びコネクタピン219がプリント基板210と平行となる向きにマウントされている。このとき、コネクタピン219は、絶縁基部219Aに植立されるとともに、シールド板212の一部が折り返され、その折り返し部212Aによりコネクタピン219の絶縁基部219Aが部品実装面81Aに押さえつけられる。

第2のチューナ82も第1のチューナ81と同様に構成されるもので、第1のチューナ81の各部210～219Aに対応する部品は220～229Aとして対応して示し、詳細な説明は省略する。この場合、図12Aと図12Bとを参照して理解されるように、第1のチューナ81のプリント基板210と、第2のチューナ82のプリント基板220とは、それらの部品実装面81A、82Aの配線パターンがほぼ対称とされ、部品実装面81A、82Aに実装される部品211、221のうちの主要な部品は、ほぼ対称に配置される。

以上のように構成された第1及び第2のチューナ81、82が、図13に示すように、プリント基板210とプリント基板220との間で平行となるとともに、プリント基板210の接地面81Bとプリント基板220の接地面82Bが対向するように、且つコネクタ218、228が受信装置80の後面パネル301から突出するようにメインのプリント基板302に設けられている。

このとき、プリント基板302には、図示しないが、2つのコネクタが設けられ、これらコネクタに第1及び第2のチューナ81、82のコネクタピン219、229が差し込まれ、これにより第1及び第2のチューナ81、82はメインのプリント基板302に接続される。

このような構成を備えることにより、プリント基板210、220の接地面81B、82Bがシールドとして作用するので、第1及び第2のチューナ81、82の一部から他方向に向けて不要放射が出ても、接地面81B、82Bにより減衰され、第1のチューナ81と第2のチューナ82との間の不要放射による相互干渉が低減される。したがって、第1のチューナ81と第2のチューナ82とを近
接して配置することができ、これらチューナ81、82から出力されるTSのビットエラー率などが悪化することがなく、性能の低下を招くことがない。

第1及び第2のチューナ81、82には、図13に示すように、シールド板2
12、222を設けるだけでよく、図4に示すチューナよりもシールド部材を減
らすことができる。更に、第1のチューナ81と第2のチューナ82とを大きく
離間させてメイン基板302に配置する必要もないのので、2つのコネクタ218、
219の間隔が必要以上に広がることもなく、受信装置80の操作性を損なうこと
もなく、しかも受信装置としての外観のデザインを損なうこともない。

さらに、チューナ81、82に対して、プリント基板210、220の外形を
同じにすることがことができるとともに、プリント基板210、220の設計が対称
となるので、基板全体の追加コストや設計の追加工数が発生することもない。第
1及び第2のチューナ81、82の間のアイソレーションを容易に確保できるだ
けでなく、特性の揃った2系統のTS出力を得ることができる。

なお、上述した第1及び第2のチューナ81、82は、互いに異なるデジタル
衛星放送を受信するものであってもよい。これらチューナ81、82から出力さ
れるTSの使用方法も任意であり、裏番組の録画だけでなく、ビクチャインビク
チャなどのに使用することもできる。

なお、本発明は、図面を参照して説明した上述の実施例に限定されるものでは
なく、添付の請求の範囲及びその主旨を逸脱することなく、様々な変更、置換又
はその同等のものを行うことができるとは当業者にとって明らかである。

産業上の利用可能性

上述したように、本発明に係る信号受信装置によれば、隣接して配置された複
数のチューナが同時に動作する際に起こる相互干渉による混信等の電波障害を低
減できる。また、従来のように金属シールドケースを用いて電磁波を遮蔽する手
法に比べて、より簡便な構成により同等以上の効果を実現できるため、省スペー
ス化及びコストダウンが図れ、装置自体が小型化できる。

また、本発明に係る信号受信回路によれば、互いに隣接して配置した場合であ
っても相互干渉による混信等の電波障害を低減でき、従来の装置のように金属シールドケースを用いて電磁波を遮蔽する手法に比べて、より簡便な構成により同等以上の効果を実現できるため、省スペース化が図れ、この信号受信回路を用いて構成される受信装置が小型化できる。

さらに、本発明を用いることにより、高価なシールド部材を減らすことができるので、受信装置のコストを抑えることができる。しかも、チューナ間の相互干渉を低減できるので、性能の劣化を招くことがない。2つのチューナを大きく離間させて配置する必要もないので、受信装置の操作性及び外観のデザインを損なうこともない。さらに、チューナを構成するプリント基板を製造するための金型の追加コストや設計の追加工数も発生しない。さらには、特性の揃った2系統のTS出力を得ることができる。
請求の範囲

１．映像信号及び／又は音声信号を所定形式で変調してなる放送波を入力する入力手段と、

上記放送波から所定周波数帯域に含まれる映像信号及び／又は音声信号を選択し復調するための回路が配置されたマウント層と、

上記マウント層の上記回路が配設される回路配設面の反対面に該マウント層と所定間隔をおいて設けられた複数のグランド層とが所定の間隔をおいて横層された信号受信手段を複数有し、

上記信号受信手段同士は、ある信号受信手段の最下層に位置するグランド層と別の信号受信手段の回路配置面が対向するように配置され、

上記選択され復調された周波数帯域の映像信号及び／又は音声信号を復号する復号手段と、

上記復号された映像信号及び／又は音声信号を外部機器へと出力する出力手段と

を備えることを特徴とする信号受信装置。

２．上記マウント層と最上層に位置するグランド層との間、及び各グランド層の間に誘電体層を有することを特徴とする請求の範囲第１項記載の信号受信装置。

３．上記信号受信手段は、一の放送波に対して複数設けられていることを特徴とする請求の範囲第１項記載の信号受信装置。

４．上記信号受信手段は、複数の放送波の各々に対応して設けられていることを特徴とする請求の範囲第１項記載の信号受信装置。

５．上記映像信号及び／又は音声信号を蓄積する記録手段を備えることを特徴とする請求の範囲第１項記載の信号受信装置。

６．上記グランド層は、２層からなることを特徴とする請求の範囲第１項記載の信号受信装置。

７．映像信号及び／又は音声信号を所定形式で変調してなる放送波を入力する入力手段と、

上記放送波から所定周波数帯域に含まれる映像信号及び／又は音声信号を選択
し後調するための回路が配置されたマウント層と、

上記マウント層の上記回路が配置される面の反対面に該マウント層と所定間隔をおいて設けられた複数のグランド層とを備え、

上記マウント層と上記複数のグランド層は、所定の間隔をおいて積層されていてすることを特徴とする信号受信回路。

8. 上記マウント層と最上層に位置するグランド層との間、及び各グランド層の間に誘電体層を有することを特徴とする請求の範囲第7項記載の信号受信回路。

9. 上記グランド層は、2層からなることを特徴とする請求の範囲第7項記載の信号受信回路。

10. 少なくとも第1及び第2のチューニングを有し、

上記第1のチューニング及び第2のチューニングは、両面プリント基板及び所定の部品をそれぞれ有し、上記両面プリント基板は、それぞれ、その一方の面が部品の実装面とされるとともに、他方の面のほぼ全面が接地面とされ、

上記第1のチューニングの両面プリント基板の実装面と、上記第2のチューニングの両面プリント基板の上記実装面とは対称とされ、

上記第1及び第2のチューニングの両面プリント基板は、上記接地面が互いに対向するように装置内部に配置された受信装置。

11. 上記第1及び第2のチューニングの両面プリント基板には、アンテナ入力コネクタがそれぞれ設けられ、これらアンテナ入力コネクタが後面パネルから突出するように、第1及び第2のチューニングの両面プリント基板が配置されている請求の範囲第10項記載の受信装置。

12. 上記第1及び第2のチューニングがそれぞれデジタル衛星放送を受信するチューニングである請求の範囲第11項記載の受信装置。

13. 上記デジタル衛星方法の番組を蓄積し再生するデバイスを有する請求の範囲第11項記載の受信装置。
# INTERNATIONAL SEARCH REPORT

**International application No.**

PCT/JP03/04238

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl.7 H04B1/08, H04N5/44, H05K3/46

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl.7 H04B1/08, H04N5/44, H05K3/46

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched


Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P,Y</td>
<td>JP 2002-135669 A (Alps Electric Co., Ltd.), 10 May, 2002 (10.05.02), Fig. 2, &amp; EP 1202564 A2 &amp; US 2002/050876 A1</td>
<td>1-9</td>
</tr>
<tr>
<td>P,Y</td>
<td>JP 2002-152611 A (Sony Corp.), 24 May, 2002 (24.05.02), Fig. 5, &amp; EP 1211919 A2 &amp; US 2002/118309 A1</td>
<td>1-9</td>
</tr>
<tr>
<td>X,Y</td>
<td>JP 11-341374 A (Matsushita Electric Industrial Co., Ltd.), 10 December, 1999 (10.12.99), Full text; Fig. 10 (Family: none)</td>
<td>10-13 1-9</td>
</tr>
</tbody>
</table>

[X] Further documents are listed in the continuation of Box C. □ See patent family annex.

* Special categories of cited documents:
  **A** document defining the general state of the art which is not considered to be of particular relevance
  **E** earlier document but published on or after the international filing date
  **L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  **O** document referring to an oral disclosure, use, exhibition or other means
  **P** document published prior to the international filing date but later than the priority date claimed

**"I"** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**"X"** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**"Y"** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

**"R"** document member of the same patent family

**Date of the actual completion of the international search**

11 June, 2003 (11.06.03)

**Date of mailing of the international search report**

24 June, 2003 (24.06.03)

**Name and mailing address of the ISA/ Japanese Patent Office**

Authorized officer

**Facsimile No.**

Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)
**INTERNATIONAL SEARCH REPORT**

**DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>JP 10-303565 A (Murata Mfg. Co., Ltd.), 13 November, 1998 (13.11.98), Fig. 4</td>
<td>1-9</td>
</tr>
<tr>
<td></td>
<td>(Family: none)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>JP 9-283974 A (Hitachi, Ltd.), 31 October, 1997 (31.10.97), Fig. 1</td>
<td>1-13</td>
</tr>
<tr>
<td></td>
<td>(Family: none)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>JP 2001-177424 A (Sony Corp.), 29 June, 2001 (29.06.01), Fig. 2</td>
<td>1-13</td>
</tr>
<tr>
<td></td>
<td>(Family: none)</td>
<td></td>
</tr>
</tbody>
</table>
INTERNATIONAL SEARCH REPORT

Box I  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6A(a).

Box II  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
- Claims 1-9 will be referred to as a first group and claims 10-13 will be referred to a second group.
- The special technical feature of the first group is that the signal reception means has a plurality of ground layers.
- The special technical feature of the second group is that two both-side printed circuit boards are arranged so that their ground surfaces oppose to each other.
- Accordingly, there exists no special technical feature common to the first group and the second group.
- Consequently, this international application contains two inventions.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☑ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant’s protest.
☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)
国際調査報告

国際出願番号 PCT／JP03／04238

A. 発明の属する分野の分類（国際特許分類（IPC））
Int. C17 H04B1／08 H04N5／44 H05K3／46

B. 調査を行った分野
調査を行った最小限資料（国際特許分類（IPC））
Int. C17 H04B1／08 H04N5／44 H05K3／46

最小限資料以外の資料で調査を行った分野に含まれるもの
日本国実用新案公報 1942－1996年
日本国公開特許公報 1971－2003年
日本国出願実用新案公報 1994－2003年
日本国出願実用新案公報 1996－2003年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

C. 関連すると認められる文献

<table>
<thead>
<tr>
<th>引用文献のカテゴリ※</th>
<th>引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示</th>
<th>関連する請求の範囲の番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>J, P, Y</td>
<td>JP 2002－135669 A（アルプス電気株式会社）</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2002.05.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>第2図</td>
<td></td>
</tr>
<tr>
<td></td>
<td>＆ EP 1202564 A2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>＆ US 2002／050876 A1</td>
<td></td>
</tr>
</tbody>
</table>

※ 引用文献のカテゴリ
「A」 特に関連のある文献ではなく、一般的技術水準を示すもの
「E」 国際出願日以前の出願または特許であるが、国際出願日後に出願されしたもの
「L」 優先権主張に係る以前の出願又は他の文献のみで発行日若しくは他の特別理由を考慮した範囲にかかる文献
「O」 特開を含む特定の文献
「P」 国際出願日前で、かつ優先権の主張の基礎となる出願

X C欄の続きに文献が挙げられている。

□ パテントファミリーに関する別紙を参照。

<table>
<thead>
<tr>
<th>国際調査を完了した日</th>
<th>国際調査報告の発送日</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.06.03</td>
<td>24.06.03</td>
</tr>
</tbody>
</table>

国際調査機関の名称及び住所
日本国特許庁（ISA／JP）
〒100－8915
郵便番号100－8915
東京都千代田区霞が関中央4番3号

特許庁審査官（権限のある職員）
江口 能弘

電話番号 03－3581－1101 内線 3534

様式PCT／ISA／210（第2ページ）（1998年7月）
<table>
<thead>
<tr>
<th>引用文献のカテゴリ*</th>
<th>引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示</th>
<th>関連する請求の範囲の番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>JP 11-341374 A（松下電器産業株式会社）1999.12.10全文、第10図（ファミリーなし）</td>
<td>10-13</td>
</tr>
<tr>
<td>Y</td>
<td>JP 10-303565 A（株式会社村田製作所）1998.11.13第4図（ファミリーなし）</td>
<td>1-9</td>
</tr>
<tr>
<td>A</td>
<td>JP 9-283974 A（株式会社日立製作所）1997.10.31第1図（ファミリーなし）</td>
<td>1-13</td>
</tr>
<tr>
<td>A</td>
<td>JP 2001-177424 A（ソニー株式会社）2001.06.29第2図（ファミリーなし）</td>
<td>1-13</td>
</tr>
</tbody>
</table>

株式PCT/ISA/210（第2ページの続き）（1998年7月）
第１欄　請求の範囲の一部の調査ができないときの意見（第１ページの２の続き）

法第８条第３項（PCT T7条(2) (a)）の規定により、この国際調査報告は次の理由により請求の範囲の一部について作成しなかった。

1. □ 請求の範囲　………………………………は、この国際調査機関が調査をすることを要しない対象に係るものである。つまり、

2. □ 請求の範囲　………………………………は、有意義な国際調査をすることができる理由まで所定の要件を満たしていない国際出願の要件に係るものである。つまり、

3. □ 請求の範囲　………………………………は、従属請求の範囲であってPCT規則6.4(a)の第2文及び第3文の規定に従って記載されていない。

第２欄　発明の単一性が欠如しているときの意見（第１ページの３の続き）

次に述べるようにこの国際出願に二以上の発明があるとこの国際調査機関は認めた。

請求の範囲1－9を第1群、請求の範囲10－13を第2群と呼ぶことにする。
第1群の特別な技術的特徴は、信号受信手段が複数のグランド層を有することである。
第2群の特別な技術的特徴は、2枚の印刷基板を、その接地面が互いに対向するように配置することである。
したがって、第1群と第2群との間に、共通の特別な技術的特徴がない。
したがって、この国際出願には、2つの発明がある。

1. □ 出願人が必要な追加調査手数料をすべて期間内に配付したので、この国際調査報告は、すべての調査可能な請求の範囲について作成した。

2. □ 追加調査手数料を要求するまでもなく、すべての調査可能な請求の範囲について調査することができたので、追加調査手数料の配付を求めなかった。

3. □ 出願人が必要な追加調査手数料を一部の期間内に配付しなかったので、この国際調査報告は、手数料の配付のあった次の請求の範囲のみについて作成した。

4. □ 出願人が必要な追加調査手数料を期間内に配付しなかったので、この国際調査報告は、請求の範囲の最初に記載されている発明に係る次の請求の範囲について作成した。

追加調査手数料の異議の申立てに関する注意
 □ 追加調査手数料の配付と共に出願人から異議申立てがあった。
 □ 追加調査手数料の配付と共に出願人から異議申立てがなかった。

様式PCT／ISA／210（第1ページの続けて1）（1998年7月）
# Electronic Patent Application Fee Transmittal

<table>
<thead>
<tr>
<th>Application Number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Filing Date:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title of Invention:</th>
<th>METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>First Named Inventor/Applicant Name:</th>
<th>Jun-Hyung KIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filer:</td>
<td>Daniel Y.J. Kim/Deborah Kimberlin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attorney Docket Number:</th>
<th>EZ-0007</th>
</tr>
</thead>
</table>

Filed as Large Entity

## U.S. National Stage under 35 USC 371 Filing Fees

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee Code</th>
<th>Quantity</th>
<th>Amount</th>
<th>Sub-Total in USD($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Filing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Stage Fee</td>
<td>1631</td>
<td>1</td>
<td>310</td>
<td>310</td>
</tr>
<tr>
<td>Natl Stage Search Fee - Report provided</td>
<td>1642</td>
<td>1</td>
<td>410</td>
<td>410</td>
</tr>
<tr>
<td>National Stage Exam - all other cases</td>
<td>1633</td>
<td>1</td>
<td>210</td>
<td>210</td>
</tr>
</tbody>
</table>

| Pages:                                    |          |          |        |                      |

| Claims:                                   |          |          |        |                      |
| Claims in excess of 20                    | 1615     | 6        | 50     | 300                  |

| Miscellaneous-Filing:                     |          |          |        |                      |

<p>| Petition:                                 |          |          |        |                      |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Fee Code</th>
<th>Quantity</th>
<th>Amount</th>
<th>Sub-Total in USD ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent-Appeals-and-Interference:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Allowance-and-Post-Issuance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension-of-Time:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total in USD ($)</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>1230</strong></td>
</tr>
</tbody>
</table>
### Electronic Acknowledgement Receipt

| EFS ID: | 3331965 |
| Application Number: | 12094376 |
| International Application Number: | PCT/KR06/05037 |
| Confirmation Number: | 1823 |

**Title of Invention:** METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

| First Named Inventor/Applicant Name: | Jun-Hyung KIM |
| Customer Number: | 34610 |
| Filer: | Daniel Y.J. Kim/Deborah Kimberlin |
| Filer Authorized By: | Daniel Y.J. Kim |
| Attorney Docket Number: | EZ-0007 |
| Receipt Date: | 20-MAY-2008 |
| Filing Date: | |
| Time Stamp: | 17:44:50 |
| Application Type: | U.S. National Stage under 35 USC 371 |

### Payment information:

- **Submitted with Payment:** yes
- **Payment Type:** Credit Card
- **Payment was successfully received in RAM:** $1230
- **RAM confirmation Number:** 2504
- **Deposit Account:**
- **Authorized User:**

### File Listing:

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Document Description</th>
<th>File Name</th>
<th>File Size(Bytes)/Message Digest</th>
<th>Multi Part/zip</th>
<th>Pages (if appl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transmittal of New Application</td>
<td>Transmittal.pdf</td>
<td>505361</td>
<td>no</td>
<td>3</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------</td>
<td>----------------</td>
<td>--------</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td>Warnings:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Authorization for Extension of Time all replies</td>
<td>Authorization.pdf</td>
<td>98965</td>
<td>no</td>
<td>1</td>
</tr>
<tr>
<td>Warnings:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PreliminaryAmendment.pdf</td>
<td>167150</td>
<td>yes</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Multipart Description/PDF files in .zip description**

<table>
<thead>
<tr>
<th>Document Description</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary Amendment</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Specification</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Applicant Arguments/Remarks Made in an Amendment</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Information:**

<table>
<thead>
<tr>
<th></th>
<th>WO2007064125.pdf</th>
<th>3518489</th>
<th>yes</th>
<th>54</th>
</tr>
</thead>
</table>

**Multipart Description/PDF files in .zip description**

<table>
<thead>
<tr>
<th>Document Description</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Specification</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>Claims</td>
<td>32</td>
<td>42</td>
</tr>
<tr>
<td>Drawings-only black and white line drawings</td>
<td>43</td>
<td>52</td>
</tr>
<tr>
<td>Documents submitted with 371 Applications</td>
<td>53</td>
<td>54</td>
</tr>
</tbody>
</table>

**Warnings:**

<table>
<thead>
<tr>
<th></th>
<th>Application.pdf</th>
<th>4210349</th>
<th>yes</th>
<th>52</th>
</tr>
</thead>
</table>

**Information:**
<table>
<thead>
<tr>
<th>Document Description</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Claims</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>Abstract</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Drawings-only black and white line drawings</td>
<td>43</td>
<td>52</td>
</tr>
</tbody>
</table>

**Warnings:**

**Information:**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Files Size (in bytes):** 16073305
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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

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

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

In re Application of Jun-Hyung KIM; Ho YI and Min-Haeng CHO

Serial No.: National Stage Application of International Application No. PCT/KR2006/005037

International Filing Date: November 28, 2006
U.S. National Stage Filing Date: May 20, 2008

For: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

INFORMATION DISCLOSURE STATEMENT

U.S. Patent and Trademark Office
Customer Service Window, BOX PCT
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 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 materials 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 US. 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(c)(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 or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2).

4. The references were cited in a corresponding International application. An English language version of the PCT International Search Report dated February 23, 2007 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: May 20, 2008

Please direct all correspondence to Customer Number 34610

DYK/dak
\k4\Documents\2309\2309-007\159753.doc
# LIST OF ART CITED BY APPLICANT

**PTO-1449**

## U.S. PATENT DOCUMENTS

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>*PATENT NO.</th>
<th>*ISSUE DATE</th>
<th>*INVENTOR NAME</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>FILING DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,272,312 B1</td>
<td>08/07/2001</td>
<td>Takayama et al.</td>
<td>455</td>
<td>3.02</td>
<td>01/08/1999</td>
</tr>
</tbody>
</table>

## U.S. PATENT APPLICATION PUBLICATIONS

<table>
<thead>
<tr>
<th>*PATENT APPLN. PUB. NO.</th>
<th>*PUB. DATE</th>
<th>*APPLICANT</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

## U.S. PATENT APPLICATIONS

<table>
<thead>
<tr>
<th>*APPLN. NO.</th>
<th>*FILING DATE</th>
<th>*INVENTOR</th>
<th>CLASS</th>
<th>SUBCLASS</th>
</tr>
</thead>
</table>

## FOREIGN PATENT DOCUMENTS

<table>
<thead>
<tr>
<th>EXAMINER'S INITIALS</th>
<th>PATENT NO.</th>
<th>DATE</th>
<th>COUNTRY</th>
<th>CLASS</th>
<th>SUBCLASS</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WO 03/085851 A1</td>
<td>10/16/2003</td>
<td>WIPO (English Abstract and Japanese Full Text)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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


## EXAMINER DATE CONSIDERED

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.
**Electronic Acknowledgement Receipt**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFS ID:</td>
<td>3332132</td>
</tr>
<tr>
<td>Application Number:</td>
<td>12094376</td>
</tr>
<tr>
<td>International Application Number:</td>
<td></td>
</tr>
<tr>
<td>Confirmation Number:</td>
<td>1823</td>
</tr>
<tr>
<td>Title of Invention:</td>
<td>METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER</td>
</tr>
<tr>
<td>First Named Inventor/Applicant Name</td>
<td>Jun-Hyung KIM</td>
</tr>
<tr>
<td>Customer Number:</td>
<td>34610</td>
</tr>
<tr>
<td>Filer:</td>
<td>Daniel Y.J. Kim/Deborah Kimberlin</td>
</tr>
<tr>
<td>Filer Authorized By:</td>
<td>Daniel Y.J. Kim</td>
</tr>
<tr>
<td>Attorney Docket Number:</td>
<td>EZ-0007</td>
</tr>
<tr>
<td>Receipt Date:</td>
<td>20-MAY-2008</td>
</tr>
<tr>
<td>Filing Date:</td>
<td></td>
</tr>
<tr>
<td>Time Stamp:</td>
<td>17:59:24</td>
</tr>
<tr>
<td>Application Type:</td>
<td>U.S. National Stage under 35 USC 371</td>
</tr>
</tbody>
</table>

**Payment information:**

Submitted with Payment: no

**File Listing:**

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Document Description</th>
<th>File Name</th>
<th>File Size(Bytes)</th>
<th>Multi Part / .zip</th>
<th>Pages (if appl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Disclosure Statement Letter</td>
<td>EZ0007IDS.pdf</td>
<td>603739</td>
<td>no</td>
<td>3</td>
</tr>
</tbody>
</table>

**Warnings:**

**Information:**
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: METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

Abstract: The present invention relates to a connection state setting method of a dual tuner and an apparatus. In accordance with an embodiment of the present invention, the method of setting a tuner connection state of n satellites in a digital broadcast receiver having the plurality of tuners, n being a natural number, that are connected to one or more antennas includes setting the tuner connection state for each satellite by using a satellite signal inputted from each satellite, which has information on one antenna, and setting the tuner connection state between the satellites by using a connection state set for each satellite and the satellite signal inputted from each satellite. Accordingly, with the present invention, the digital broadcast receiver having two tuners can automatically set the connection state of satellite lines of each tuner.
[DESCRIPTION]

【Invention Title】

METHOD AND DEVICE FOR SETTING CONNECTION TYPE OF DUAL TUNER

【Technical Field】

The present invention relates to a digital broadcast receiver, more specifically to a method and an apparatus for setting a connection state between N satellites in a digital broadcast receiver employing two tuners.

【Background Art】

A digital broadcast receiver, such as a digital TV and a set top box (STB), has been widely used recently. As illustrated in FIG. 1, this typical digital broadcast receiver functions as the set top box that performs personal video recoding (PVR), which writes and stores a digital broadcast program in large capacity writing means such as a hard disk drive (HDD). Also, the digital broadcast receiver is connected to a satellite broadcast antenna 20 and a television 40.

The satellite broadcast antenna 20, for receiving a digital satellite broadcast re-broadcasted through a plurality of satellites, receives and outputs to a digital broadcast receiver 30 a digital satellite broadcast re-broadcasted by a transponder. The
transponder receives an electric wave transmitted from a broadcast station on the ground and amplifies and re-transmits to the ground the received electric wave.

Provided in the center of the satellite broadcast antenna 20 is a low noise block down converter (LNB), which converts a frequency of 4 to 12GHz to frequency of 1GHz.

The digital broadcast receiver 30 restores and processes the original video and audio signals of a digital broadcast program of MPEG2 transport stream, received through the satellite broadcast antenna 20. Then, the digital broadcast receiver 30 outputs and displays the video and audio signals through a television 40 such that a user can watch a desired digital broadcast program.

The digital broadcast receiver 30 can employ two tuners to allow the user to record a channel while watching another channel. The tuner tunes satellite signals inputted through the LNB to a signal of a particular preset frequency.

However, a conventional digital broadcast receiver 30 is restricted to use the two tuners in accordance with the number of LNBs that receive satellite signals.

For example, when polarization, high band and low band are selected in one LNB, if a particular frequency (e.g. horizontal polarization and high band) is received only, all tuners tune to a specific frequency within one satellite signal.

Owing to this restriction, the digital broadcast receiver 30 requires a user to set a loop-through mode or a separate mode through a user menu. In the loop-through mode,
two tuners share an LNB signal provided through one signal line. In the separate mode, each tuner independently tunes a different LNB signal provided through two signal lines.

In case that LNB signals received through the two signal lines are the same, the digital broadcast receiver 30, which has set the connection mode of the satellite signal for two tuners, makes the two tuners search for a channel or copy a channel, searched from one tuner, to the other tuner.

However, it is not easy for a general user who uses the digital broadcast receiver employing two tuners to understand the restriction. If the user wrongly sets the two tuners as the loop-through mode or separate mode, the two tuners can not function properly.

【Disclosure】

【Technical Problem】

The present invention, to solve the problem of the above-described conventional art, provides a method and an apparatus for setting a connection state of a dual tuner that can allow a satellite line connection state of each tuner to be automatically set in the digital broadcast receiver employing two tuners.

The present invention also provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user's convenience by automatically
setting a satellite signal line connection state of each tuner, which is complicated to set.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can reduce the possibility of erroneously setting the tuner, which has been frequently generated, due to having the same transponder (TP) information for different satellites in case that a digital satellite equipment control (DiSEqC) switch is used.

Moreover, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can set a connection state of each tuner as any one of a single type, a loop-through type, a dual same type and a dual different type.

Furthermore, the present invention provides a method and an apparatus for setting a connection state of a dual tuner that can improve a user’s convenience by setting a tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recoding or watching.

【Technical Solution】

An aspect of the present invention features a method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners.
According to an embodiment of the present invention, a method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, executed in a digital broadcast receiver having a plurality of tuners includes the steps of setting the tuner connection state for each satellite by using a satellite signal received from each satellite, and setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

The step of setting the tuner connection state for each satellite includes the steps of determining whether each of a first tuner and a second tuner is tuned, by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite; if each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; tuning any one of the first tuner and the second tuner to a second satellite signal having polarization properties different from the first satellite signal if it is determined that the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; and setting the connection state of the
satellite as dual same if the first tuner and the second tuner are tuned by the first satellite signal and the second satellite signal, respectively.

The step of setting the tuner connection state between the satellites by using a connection state set for each satellite includes the steps of tuning each of the first tuner and the second tuner to the third satellite signal, extracting program specification information (PSI) or service information (SI) from the third satellite signal inputted through the first tuner, tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal, extracting second PSI or SI from the third satellite signal inputted through the second tuner, determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI and setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

Another aspect of the present invention features a digital broadcast receiver of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas.

According to an embodiment of the present invention, a digital broadcast receiver includes a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite; a demodulator, demodulating the satellite signal; a demultiplexer, classifying the demodulated satellite signal in accordance with data type
and outputting the classified data; a decoder, decoding each of the data classified by the
demultiplexer; and a processor, setting a tuner connection state corresponding to \( N \) satellites, \( N \) being a natural number, by use of the satellite signal inputted through the
tuner, whereas the processor sets a connection state of the tuner for each satellite, each
satellite having information for one satellite, and then sets a tuner connection state
between the satellites by using the connection state set for each satellite.

【Advantageous Effects】

By providing a method and an apparatus for setting a connection state of a dual
tuner in accordance with the present invention, a satellite line connection state of each
tuner can be automatically set in the digital broadcast receiver employing two tuners.

With the present invention, a user's convenience can be improved by
automatically setting a satellite line connection state of each tuner, which is complicated
to set. With the present invention, the possibility of erroneously setting the tuner, which
has been frequently generated, can be reduced by having the same TP information for
different satellites in case that a digital satellite equipment control (DiSEqC) switch is
used.

With the present invention, a connection state of each tuner can be set as any
one of a single type, a loop-through type, a dual same type and a dual different type.

With the present invention, a user's convenience can be improved by setting a
tuner connection state between satellites to have a connection state of each tuner pre-recognized when a new channel is added to channels reserved for recoding or watching.

5 【Description of Drawings】

FIG. 1 illustrates a connection state of a general digital broadcast receiver;

FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention;

FIG. 3 and FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite;

FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver;

FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention;

FIG. 7 illustrates a flow chart illustrating a method of setting a connection state of each tuner for M satellites searched by a digital broadcast receiver;

FIG. 8 is a state table for setting a connection state of setting M antennas in accordance with an embodiment of the present invention;

FIG. 9 is a flow chart illustrating a method of setting a connection state of
setting M antennas in accordance with an embodiment of the present invention; and

FIG. 10 is a flow chart illustrating a method of setting a connection state between satellites in accordance with an embodiment of the present invention.

5  【Mode for Invention】

Since there can be a variety of permutations and embodiments of the present invention, certain embodiments will be illustrated and described with reference to the accompanying drawings. This, however, is by no means to restrict the present invention to certain embodiments, and shall be construed as including all permutations, equivalents and substitutes covered by the spirit and scope of the present invention. Throughout the drawings, similar elements are given similar reference numerals.

Hereinafter, the embodiments will be described with reference to the accompanying drawings, examples of which are illustrated in the accompanying drawings, wherein like reference numbers refer to like elements throughout. Throughout the description of the present invention, when describing a certain technology is determined to evade the point of the present invention, the pertinent detailed description will be omitted.

FIG. 2 is a block diagram illustrating an inside structure of a digital broadcast receiver in accordance with an embodiment of the present invention, and FIG. 3 and
FIG. 4 illustrate a connection mode of a digital broadcast receiver and a satellite. FIG. 5 illustrates a connection mode of two tuners in a digital broadcast receiver.

Referring to FIG.2, a digital broadcast receiver 200 in accordance with the present invention comprises two tuners 210a and 210b, a demodulator 215, a demultiplexer 220, a decoder 225, a data output unit 230, a memory 235 and a processor 240. FIG. 2 illustrates the digital broadcast receiver 200 employing two tuners only. However, it shall be evident that the digital broadcast receiver 200 in accordance with the present invention can have two or more tuners. Similarly, FIG. 2 illustrates that the digital broadcast receiver 200 includes one demultiplexer 220 and one decoder 225. However, the digital broadcast receiver 200 in accordance with the present invention can have the same numbers of the demultiplexer 220 and the decoder 225, respectively, as the number of the provided tuners 210 in accordance with a method of embodying the digital broadcast receiver 200.

The demodulator 215, by the control of the processor 240, demodulates and transfers to the demultiplexer 220 a signal (i.e. an electrical signal) inputted through the tuners 210a and 210b.

The demultiplexer 220 parses an audio signal, a video signal and data, demodulated and inputted by the demodulator 215, and divides the audio signal, the video signal and the data in accordance with each data type to output the respective
divided signals to the decoder 225. In the drawing, one decoder 225 is illustrated. It is evident, however, that the decoder 225 can be realized as a video decoder, an audio decoder and a data decoder in accordance with the function of the decoder 225. The data type can be video data, audio data and/or information data.

The decoder 225 decodes the original audio, video and data signals (hereinafter, referred to as "information data" for the convenience of understanding and description) by decoding the respective data, divided and inputted by the demultiplexers 220 by the control of the processor 240, in accordance with a predetermined method. Also, the decoder 225, by the control of the processor 240, outputs through the output unit 230 or stores in the memory 235 the respective data. FIG. 2 illustrates that one decoder 225 decodes the video, audio and information data. However, it is shall be evident that an individual decoder (e.g. a video decoder, an audio decoder and an information decoder) can be provided to decode each kind of data.

The memory 235 can include a volatile memory and a non-volatile memory. The video data, the audio data and the information data, decoded by the decoder 225, are written in the memory 235 by the control of the processor 240. The memory 235 also stores an algorithm to operate the digital broadcast receiver 200 in accordance with the present invention.

The data output unit 230, by the control of the processor 240, outputs the video and/or audio data stored in the memory 235 or outputs the information data by the
on-screen display (OSD) method. The OSD indicates a screen of a display apparatus (e.g. a monitor or a television), coupled to the data output unit 230, on which desired information is self-displayed without the input of an additional video signal. Of course, the data output unit 230 can output the respective data, decoded by the decoder 225, to the display apparatus by the control of the processor 240.

The processor 240 controls internal elements of the digital broadcast receiver 200 in accordance with the present invention (e.g. the tuners 210a and 210b, the demodulator 215, the demultiplexer 220, the decoder 225, the data output unit 230 and memory 235).

Also, the processor 240 can set a connection state between each satellite and a tuner 210a or 210b corresponding to each satellite. This will be described below with reference to the related drawings.

In the digital broadcast receiver, the connection type of the satellite signal line can be classified in accordance with the number of signal lines. For example, in case that one signal line is provided, as illustrated in FIG. 3, only one signal is connected to the satellite signal line at a time by connecting a digital satellite equipment control (DiSEqC) switch (not shown) in accordance with the number of the LNB. As illustrated in FIG. 4, in case that two signal lines are provided, the same satellite signals or different satellite signals are connected to two DiSEqC switches. The DiSEqC switch automatically selects a plurality of satellite antennas with one satellite receiver. One
receiver can typically receive signals from 4 antennas or polarized signals from up to 8 antennas.

First, a connection mode in accordance with a physical connection of satellite signal lines to each tuner will be briefly described for the convenience of understanding and the description. Hereinafter, the connection mode will be described based on the case of two tuners.

As illustrated in (a) of FIG. 5, a case in which any one (e.g. a first tuner 210a) of the two tuners 210a and 210b is connected to the satellite signal line is referred to as a “single tuner.” That is, the single tuner represents a mode in which any one of the two tuners is only used. For the convenience, the mode in which only the first tuner 210a (refer to FIG. 2) is connected to the satellite signal line is referred to as a “first single tuner.” Another mode in which only a second tuner 220b (refer to FIG. 2) is connected to the satellite signal line is referred to as a “second single tuner.”

As illustrated in (b) of FIG. 5, a connection mode in which the two tuners 210a and 210b are connected to one satellite signal line, and the same satellite signal is inputted to the first tuner 210a and the second tuner 210b, is referred to as a “loop-through.” That is, in the loop-through connection mode, an output part of the first tuner 210a and an input part of the second tuner 210b are connected. Accordingly, as illustrated in (b) of FIG. 5, a satellite signal received through the antenna can be inputted via an input part of the first tuner 210a and tuned. Then, the same satellite
signal outputted through the output part of the first tuner 210a can be inputted via the input part of the second tuner 220b and tuned. Here, the same satellite signal means a signal of the same polarization properties inputted from the same satellite. A satellite can send a satellite signal of vertically polarized wave properties and another satellite signal of horizontally polarized wave properties. In case of the loop-through, since one satellite signal line is connected to the antenna, the tuners 210a and 210b, respectively, can be tuned by the satellite signals of the same polarization properties.

As illustrated in (c) of FIG. 5, two satellite signal lines are connected to the tuners 210a and 210b. The satellite signal lines connected to the tuners 210a and 210b are connected to one or more antennas. The tuners 210a and 210b can receive a satellite signal from the same satellite. This connection mode is referred to as a "dual same." In case of the dual same, since a satellite signal line is connected to each of the tuners 210a and 210b through the respective LNB, the tuners 210a and 210b can receive from the same satellite and tune to the respective satellite signal. For example, the first tuner 210a can receive and tune to a first satellite signal corresponding to the vertically polarized wave. The second tuner 210b can receive and tune to a second satellite signal corresponding to the horizontally polarized wave. In addition, as illustrated in (c) of FIG. 5, since the satellite signal lines connected to the respective tuners are coupled to one antenna, the first tuner 210a and the second tuner 210b, respectively, can receive signals of different polarization properties from the same satellite and be tuned.
As illustrated in (d) of FIG. 5, a connection mode in which each of the tuners 210a and 210b is connected to each satellite signal line through its own corresponding antenna is referred to as a “dual different.” For example, in case of the dual different, since the input parts of the first and second tuners 210a and 210b are connected to the respective signal lines, the first and second tuners 210a and 210b can be independently tuned. Further, in case of the dual different, unlike the dual same, the satellite signal lines, each of which is connected to the first tuner 210a and the second tuner 210b, respectively, are connected to different satellites. The two tuners 210a and 210b are independently tuned by the different satellite signals.

FIG. 6 is a flow chart illustrating a method in which a digital broadcast receiver checks a connection state of a plurality of tuners in accordance with an embodiment of the present invention. It is hereinafter assumed that the digital broadcast receiver 200 employs two tuners 210a and 210b and the processor 240 sets and stores in the memory an antenna connection state for M searched satellites, M being a natural number larger than zero. As such, when the connection state for the M searched satellites is stored, if the connection state for a satellite is required to be re-checked (e.g. a connection state in accordance with the change of antenna information through a menu of the channel search for a concerned satellite or the satellite state diagnosis is requested to be re-checked (or re-set)), the processor 240 can receive the satellite signal from a
transponder corresponding to the concerned satellite and set the connection state for each of the tuners 210a and 210b.

In a step represented by 610, the processor 240 determines whether the first tuner 210a and the second tuner 210b, respectively, are tuned by using each satellite signal of different polarization properties that is received from a transponder corresponding to the present satellite K.

For example, the first tuner 210a can try to be tuned to the first satellite signal received from the transponder. The second tuner 210b can try to be tuned to the second satellite signal having different polarization properties. The first and second satellite signals can be received through the same satellite or different satellites.

If the first tuner 210a and the second tuner 210b are tuned by the respective TP information of different polarization properties, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the separate in a step represented by 615.

However, if the first tuner 210a and the second tuner 210b are not tuned by the respective TP information, the processor 240 writes the connection state of the first and second tuners 210a and 210b in the memory 225 as the loop-through in a step represented by 620.

If the connection state of the first and second tuners 210a and 210b for the present satellite K is set in steps represented by 610 through 620, the processor 240 sets
the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N. A method of setting the connection state is described below.

To set the connection state of the first and second tuners 210a and 210b between the present satellite K and a searched satellite N, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the IP information received from the present satellite K (hereinafter, referred to as “first TP information” for the convenience of understanding and description) and the TP information received from the searched satellite N (hereinafter, referred to as “second TP information” for the convenience of understanding and description) and determines whether both the first tuner 210a and the second tuner 210b are tuned, in a step represented by 625.

For example, in case that the present satellite K and the searched satellite N employ the same antenna by using the same switch, the first tuner 210a and the second tuner 210b cannot be independently tuned at the same time.

Accordingly, the processor 240 tunes the first tuner 210a and the second tuner 210b by using the first TP information and the second TP information received from each respective satellite. As a result of tuning them, if the first and second tuners 210a and 210b are independently tuned, the processor 240 determines that the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N is the separate. If the first tuner 210a and the second tuner 210b,
respectively, are independently tuned, in a step represented by 630, the processor 240 writes in the memory 255 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the separate.

If the first tuner 210a and the second tuner 210b, respectively, are not independently tuned, in a step represented by 635, the processor 240 writes in the memory 255 the connection state of each of the tuners 210a and 210b between the present satellite K and the searched satellite N as the loop-through.

Here, the processor 240 can set a connection state of each of the tuners 210a and 210b between the present satellite K and respective searched satellites by repeating the steps represented by 625 through 635 M times.

FIG. 7 illustrates a flow chart illustrating a method of setting a connection state of each tuner for M satellites searched by a digital broadcast receiver, and FIG. 8 is a state table for setting a connection state of setting M antennas in accordance with an embodiment of the present invention. The method of checking a connection state of the satellite signal line of each of the tuners 210a and 210b by automatically tuning without separate software setting will be described below in detail. It is assumed that the digital broadcast receiver 200 employs two tuners 210a and 210b. Also, the method of setting a connection state of each tuner 210a or 210b of the satellites and of between the satellites in a state that M satellites, M being a natural number, are searched will be hereinafter
described. Here, since the method of searching M satellites and the method of setting antenna information for each satellite are well-known to those of ordinary skill in the art, the related description will be omitted.

Typically, a digital satellite broadcast signal is relayed through a transponder. The satellite broadcast antenna receives and transfers to the digital broadcast receiver 200 the digital satellite broadcast signal. The digital satellite broadcast signal received through each antenna is referred to as “TP information” or a “satellite signal” the convenience of understanding and description. The TP information or the satellite signal can be information in a transport stream unit. Also, the method of setting a connection state of each tuner 210a or 210b of the satellites and of between the satellites, corresponding to the set antenna information in a state that the satellite signal line connected to each antenna is physically coupled to each tuner 210a or 210b, will be described in detail.

Although the below description relates to the method of setting each antenna and connection state of the tuners 210a and 210b between the antenna settings for the setting of M antennas, the method of setting the connection state of M satellites and between the satellites will be described for the convenience of understanding and description.

If M satellites are searched through a plurality of antennas as illustrated in FIG. 8, the connection state of each tuner 210a or 210b of each satellite and between the
satellites is set by checking the connection state M x M times.

Briefly describing FIG. 8, “A” represents each component, in which the two tuners 210a and 210b are tuned by using each of the TP information having different polarization properties received from each satellite (i.e. each of the TP information having different polarization properties received from one satellite). “B” and “C” represent components, in which the tuners 210a and 210b are tuned by using TP information received from different satellites. That is, B and C set the connection state between the satellites by using the connection state set by A. Since B and C are symmetrical with each other, and thus the connection state for any one component of B and C is required to be set and used, it is assumed that the connection state for one component is set.

Referring to FIG. 7, if M satellites are searched in a step represented by 710, first, the connection state of each satellite having corresponding antenna information is set. For example, referring to FIG. 8, a diagonal group 810 sets the connection state of each satellite having concerned antenna information. Accordingly, the tuner connection state of each satellite x, x being a natural number, can be checked by tuning the first tuner 210a and the second tuner 210b with a satellite signal transmitted from the satellite x.

For example, assuming that the first tuner 210a is tuned to the first satellite signal but the second tuner 210b is not tuned, the processor 240 can set the tuner
connection of the satellite x as the first single tuner. This is described below in detail
with reference to FIG. 9.

Once the whole tuner connection state of the respective M satellites is set, the
processor 240 sets, in a step represented by 620, the connection state of the tuners 210a
and 210b of each satellite (e.g. the first satellite and the second satellite) having
different antenna information by using the connection state by the step represented by
610. This is described below in detail with reference to FIG. 10.

For example, referring to FIG. 8, since all connection states of each tuner 210a
or 210b of the respective satellite x are set, the connection state of the tuners 210a and
210b of each satellite (i.e. the first satellite and the second satellite) having different
antenna settings can be set by using the connection state of the satellite x.

Referring to FIG. 8, since a first area 820 and a second area 830 correspond to
each other, the whole connection state can be set by setting the tuner connection state of
each satellite for any one of the first area 820 and the second area 830.

FIG. 9 is a flow chart illustrating a method of setting a connection state of
setting M antennas in accordance with an embodiment of the present invention. The
method of setting the connection state of each satellite x, x being a natural number
larger than zero, of the diagonal group 810 will be described with reference to FIG. 8.

That is, the method of setting the tuner connection state for the component A will be
hereinafter described. Further, the method of setting each tuner connection state after receiving at least one item of TP information (i.e. satellite signal) having different polarization properties from at least one transponder corresponding to a satellite \( x \) will be described.

Although the below description relates to the method of setting the connection state for respective \( N \) antenna settings, the method of setting the connection state of \( N \) satellites will be described for the convenience of understanding and description.

Referring to FIG. 9, in a step represented by 910, the processor 240 determines whether the first tuner 210a and the second tuner 210b can be tuned by tuning each of the first tuner 210a and the second tuner 210b by use of the same satellite signal (hereinafter, commonly referred to as TP information).

If neither the first tuner 210a nor the second tuner 210b is tuned by using the same TP information, the processor 240 recognizes and writes in the memory 235 the connection state of the satellite \( x \) as the single tuner, using any one of the first tuner 210a and the second tuner 210b, in a step represented by 915.

However, if both the first tuner 210a and the second tuner 210b are tuned by using the same TP information, the processor 240 extracts program specification information (PSI) or service information (SI) from a satellite signal inputted from the first tuner 210a and the second tuner 210b, respectively, in a step represented by 920.

Then, the processor 240 compares the extracted PSI or SI information with each other in
a step represented by 925.

For example, let us assume that the PSI or the SI extracted through the first tuner 210a is referred to as a “first PSI” or a “first SI”, and the PSI or the SI extracted through the second tuner 210b is referred to as a “second PSI” or a “second SI.” If it is determined that each of the abstracted PSI or SI is identical to each other, the processor 240 can recognize the connection state as at least the loop-through. If it is determined that each of the abstracted PSI or SI is different from each other, the processor 240 can recognize that the TP information tuned by the first tuner 210a and the second tuner 210b is not transmitted from the same satellite. That is, the processor 240 can recognize that the concerned TP information overlaps in at least two satellites. The PSI or the SI is included in the digital video broadcasting (DVB) standard in accordance with the digital satellite broadcast, and the PSI is included in the MPEG-2 standard. Since the method of extracting the PSI or the SI from the inputted TP information is well-known to any person of ordinary skill in the art, the redundant description will be omitted.

If it is determined that each of the PSI or SI is not identical to each other, the processor 240 returns to the step represented by 915 and writes the connection state of the respective satellite x in the memory 235.

If it is determined that each of the PSI or SI is identical to each other, the processor 240 determines, in a step represented by 930, whether both the first tuner 210a and the second tuner 210b are tuned by tuning any one of the first tuner 210a and
the second tuner 210b having the TP information of different polarization properties.

For example, a state in which the first tuner 210a and the second tuner 210b, respectively, are tuned by using TP information of vertically polarized wave (hereinafter, referred to as “first TP information”) is assumed. In the state, the processor 240 tunes the first tuner 210a by using TP information of horizontally polarized wave (hereinafter, referred to as “second TP information”) and then determines whether the first tuner 210 and the second tuner 210b are tuned.

As a result, if the first tuner 210a is tuned only and the TP information is not inputted, the processor 240 recognizes and sets the connection state of the pertinent satellite x as at least the loop-through, in a step represented by 935.

If both the first tuner 210a and the second tuner 210b are tuned, that is, the first tuner 210a and the second tuner 210b, respectively, are tuned by using the TP information of different polarized wave, the processor 240 recognizes and sets the connection state of the concerned satellite x as at least the dual same in a step represented by 940.

The processor 240 can set the tuner connection state of the respective M satellites by repeating the steps represented by 910 through 940.

FIG. 10 is a flow chart illustrating a method of setting a connection state of each satellite in accordance with the present invention. Assuming that all connection
states of each satellite $x$ of the diagonal group 810 are checked by first setting a
connection state of $M$ antennas in FIG. 9, the method of checking the connection state
of each satellite of the first area 820 in FIG. 8 by use of the connection state of the
concerned satellite $x$ will be described below. That is, Since B and C are symmetrical
with each other, the connection state of each satellite for any one of B and C will be
described.

Although the below description relates to the method of setting the connection
state for setting each of the $M$ antenna, the method of setting the connection state of $M$
satellites will be described for the convenience of understanding and description.

Further, the method of setting the connection state of each satellite after
receiving the TP information corresponding to each satellite from the transponders
corresponding to the two satellites will be described below.

The processor 240 first sets the connection state between the satellites logically
and evidently deduced from the connection state of each satellite having the same
antenna information, which is not illustrated in FIG. 10.

For example, if the connection state of the first satellite is the first single tuner,
and the connection state of the second satellite is the first single tuner, the processor 240
sets the connection states of the first and second satellites as the first single tuner. If the
first satellite and the second satellite, respectively, are the second single tuner, the
processor 240 can set the connection states of the first satellite and the second satellite
as the second single tuner.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the other, since the first satellite and the second satellite each can independently tune satellite signals that are physically different, the processor 240 sets the connection states of the first satellite and the second satellite as the dual different.

Also, if the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

Of course, if the connection state of the first satellite is the dual same, and the connection state of the second satellite is any one of the first and second single tuners, the processor 240 can similarly set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.
If the connection state of the first satellite and the second satellite, respectively, is the dual same, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual same.

If the connection state of the first satellite is any one of the first and second single tuners, and the connection state of the second satellite is the loop-through, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is any one of the first and second single tuners, since it is possible that the first satellite and the second satellite independently tune to the first tuner and the second tuner, respectively, the processor 240 can set the connection states of the first satellite and the second satellite as the dual different.

If the connection state of the first satellite is the loop-through, and the connection state of the second satellite is the loop-through, one of the two cases are possible. In one case, the first satellite and the second satellite can independently perform tuning at the same time. In the other case, the first satellite and the second satellite cannot independently perform tuning at the same time. Accordingly, in such a
case, the connection state between the satellites may be checked and set through the following method. This method will be described in detail with reference to FIG. 10.

Referring to FIG. 10, the processor 240 tries, in a step represented by 1010, to tune the first tuner 210a and the second tuner 210b by using the same TP information (hereinafter, referred to as “third TP information”). For example, the processor 240 tunes the first tuner 210a by use of the third TP information before tuning the second tuner 210b by use of the third TP information.

In a step represented by 1015, the processor 240 obtains PSI or SI from the third TP information inputted through the first tuner 210a. Since the method of obtaining the PSI or SI is well-known to any person of ordinary skill in the art, the pertinent description will be omitted. For the convenience, the PSI or SI obtained from a satellite signal inputted through the first tuner 210a tuned with the third TP information will be referred to as third PSI information or third SI information.

In a step represented by 1020, the processor 240 tunes the first tuner 210a by using TP information (referred to as “fourth TP information”, for the purpose of convenience) that is transmitted from a different satellite and is different from the third TP information.

In this state, if the third TP information tuned to the second tuner 210b is disconnected, the connection state of between two satellites can be recognized as at least the loop-through. The third TP information tuned to the second tuner 210b is not
inputted, it can be inferred that the physical connection mode of the tuners 210a and 210b is the single tuner or the loop-through.

In a step represented by 1025, the control unit extracts PSI or SI (referred to as "fourth PSI or fourth SI" for the purpose of convenience) from a satellite signal inputted through the second tuner 210b tuned with the third TP information.

The processor 240 determines whether the third PSI or the third SI is identical to the fourth PSI or the fourth SI in a step represented by 1030.

As a result, if it is determined that the third PSI or the third SI is identical to the fourth PSI or the fourth SI, the processor 240 writes, in a step represented by 1035, in the memory 235 that the connection state between two satellites is the dual different.

Since that the third PSI or the third SI is identical to the fourth PSI or the fourth SI means that the second tuner 210b is not disconnected, this also means that the first satellite and the second satellite can independently perform tuning at the same time.

If it is determined that the third PSI or the third SI is not identical to the fourth PSI or the fourth SI, the processor 240 writes in the memory 235 that the connection state between two satellites is the single tuner, in a step represented by 1040. Of course, the connection state between the two satellites can be the loop-through. However, since the respective two satellites cannot independently tune, the connection state can be configured to be the single tuner, for the purpose of convenience.

The processor 240 checks and sets the connection state of every satellite by
repeating the steps represented by 1010 through 1040.

【Industrial Applicability】

Hitherto, although some embodiments of the present invention have been shown and described for the above-described objects, it will be appreciated by any person of ordinary skill in the art that a large number of modifications, permutations and additions are possible within the principles and spirit of the invention, the scope of which shall be defined by the appended claims and their equivalents.
【CLAIMS】

【Claim 1】

A method of setting a tuner connection state of n satellites, n being a natural number, the satellites being connected to one or more antennas, the method executed in a digital broadcast receiver comprising a plurality of tuners, the method comprising:

setting the tuner connection state for each satellite by using a satellite signal received from each satellite; and

setting the tuner connection state of the tuners between the satellites by using a connection state set for each satellite and the satellite signal received from each satellite.

【Claim 2】

The method of Claim 1, wherein each of the respective satellites comprises information on one antenna, and

the antenna information comprises a combination of at least one or more items of low noise block down converter information, 22KHz tone information, satellite information and digital satellite equipment control information.

【Claim 3】

The method of Claim 1, wherein the step of setting the tuner connection state for each satellite comprises:
determining whether each of a first tuner and a second tuner is tuned, by tuning each of the first tuner and the second tuner to a first satellite signal received from a satellite;

if each of the first tuner and the second tuner is tuned, extracting program specification information (PSI) or service information (SI) from the first satellite signal inputted through the first tuner and the second tuner, respectively, and determining whether the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other;

5 tuning any one of the first tuner and the second tuner to a second satellite signal having polarization properties different from the first satellite signal if it is determined that the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are identical to each other; and

10 setting the connection state of the satellite as dual same if the first tuner and the second tuner are tuned by the first satellite signal and the second satellite signal, respectively.

【Claim 4】

20 The method of Claim 3, further comprising a step of setting the connection state
of the satellite as single tuner if any one of the first tuner and the second tuner is not tuned to a second satellite signal.

【Claim 5】

The method of Claim 3, further comprising a step of setting the connection state of the satellite as single tuner if the PSI or SI extracted from the first satellite signal inputted through the first tuner and the PSI or SI extracted from the first satellite signal inputted through the second tuner are not identical to each other.

【Claim 6】

The method of Claim 3, further comprising a step of setting the connection state of the satellite as loop-through if any one of the first tuner and the second tuner is tuned, and then the other tuner is disconnected.

【Claim 7】

The method of Claim 1, wherein the step of setting the tuner connection state between the satellites by using a connection state set for each satellite comprises:

tuning each of the first tuner and the second tuner to the third satellite signal;

extracting program specification information (PSI) or service information (SI)

from the third satellite signal inputted through the first tuner;
tuning the first tuner to a fourth satellite signal, the fourth satellite signal being a signal for a satellite that is different from the satellite of the third satellite signal;

extracting second PSI or SI from the third satellite signal inputted through the second tuner;

determining whether the extracted first PSI or SI is identical to the extracted second PSI or SI; and

setting the connection state of the satellites as dual different if the extracted first PSI or SI is identical to the extracted second PSI or SI.

【Claim 8】

The method of Claim 7, further comprising a step of setting the connection state between the satellites as the single tuner if the extracted first PSI or SI is not identical to the extracted second PSI or SI.

【Claim 9】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as a first single tuner if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the first single tuner.
【Claim 10】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as dual different if the connection state of the first satellite is the loop-through, and the connection state of the second satellite is dual same.

【Claim 11】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual same if the connection state of the first satellite is the dual same, and the connection state of the second satellite is the dual same.

【Claim 12】

The method of Claim 7, further comprising a step of setting the connection state between a first satellite and a second satellite as the dual different if the connection state of the first satellite is any one of the first single tuner and the second single tuner, and the connection state of the second satellite is the dual same.

【Claim 13】

The method of Claim 7, further comprising a step of setting the connection state
between a first satellite and a second satellite as the dual different if the connection state of the first satellite is the first single tuner, and the connection state of the second satellite is the second single tuner.

5  **[Claim 14]**

A digital broadcast receiver, comprising:

a plurality of tuners, receiving from each antenna a satellite signal transmitted from a satellite;

a demodulator, demodulating the satellite signal;

10 a demultiplexer, classifying the demodulated satellite signal in accordance with data type and outputting the classified data;

a decoder, decoding each of the data classified by the demultiplexer; and

a processor, setting a tuner connection state corresponding to N satellites, N being a natural number, by use of the satellite signal inputted through the tuner,

15 whereas the processor sets a connection state of the tuner for each satellite, each satellite having information for one satellite, and then sets a tuner connection state between the satellites by using the connection state set for each satellite.

**[Claim 15]**

20 The digital broadcast receiver of Claim 14, further comprising a memory
storing the set tuner connection state between the satellites.

【Claim 16】

The digital broadcast receiver of Claim 14, wherein the processor tunes each of a first tuner and a second tuner by using a fifth satellite signal received through a satellite, and if any one of the first tuner and the second tuner is not tuned, the processor sets the tuner connection of the satellite as a single tuner.

【Claim 17】

The digital broadcast receiver of Claim 14, wherein if each of the first tuner and the second tuner is tuned to the fifth satellite signal, the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, and if it is determined that the PSI or SI extracted from the fifth satellite signal inputted through the first tuner and the PSI or SI extracted from the fifth satellite signal inputted through the second tuner are identical to each other, tunes any one of the first tuner and the second tuner to a sixth satellite signal, the sixth satellite signal being a signal for a satellite that is different from the satellite of the fifth satellite signal, and then, if each of
the first tuner and the second tuner is tuned by the fifth satellite signal and the sixth satellite signal, respectively, sets the tuner connection state of the satellite as dual same.

【Claim 18】

The digital broadcast receiver of Claim 17, wherein the processor tunes any one of the first tuner and the second tuner to the sixth satellite signal and then sets the tuner connection state of the satellite as loop-through if any one of the first tuner and the second tuner is not tuned.

【Claim 19】

The digital broadcast receiver of Claim 17, wherein the processor extracts program specification information (PSI) or service information (SI) from each of the first tuner and the second tuner and determines whether the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, and, if it is determined that the PSI or SI extracted from the first tuner and the PSI or SI extracted from the second tuner are identical to each other, sets the tuner connection state of the satellite as single tuner.

【Claim 20】

The digital broadcast receiver of Claim 14, wherein, if the connection state of
each of a third satellite and a fourth satellite is a first single tuner, the processor sets a
tuner connection state between the third satellite and the fourth satellite as a first single
tuner, and

if the connection state of each of the third satellite and the fourth satellite is a
second single tuner, the processor sets the tuner connection state between the third
satellite and the fourth satellite as a second single tuner.

【Claim 21】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a
third satellite is any one of a first single tuner and a second single tuner, and a
connection state of a fourth satellite is the other, the processor sets a tuner connection
state between the third satellite and the fourth satellite as dual different.

【Claim 22】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a
third satellite is any one of a first single tuner, a second single tuner and loop-through,
and a connection state of a fourth satellite is dual same, the processor sets a tuner
connection state between the third satellite and the fourth satellite as dual different.

【Claim 23】
The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is dual same, and a connection state of a fourth satellite is dual same, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 24】

The digital broadcast receiver of Claim 14, wherein, if a connection state of a third satellite is any one of a first single tuner and a second single tuner, and a connection state of a fourth satellite is loop-through, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 25】

The digital broadcast receiver of Claim 14, wherein, if a connection state of each of a third satellite and a fourth satellite is loop-through, the processor determines whether the first tuner and the second tuner can be independently tuned at the same time and, if the first tuner and the second tuner can be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as dual different.

【Claim 26】
The digital broadcast receiver of Claim 25, wherein, if the first tuner and the second tuner cannot be independently tuned at the same time, the processor sets a tuner connection state between the third satellite and the fourth satellite as a single tuner.
Figure 3

Satellite 1 ........ Satellite M

Switch

Signal line
Start

Yes

Can each tuner be independently tuned?

No

Write tuner connection state of present satellite as separate

610

Write tuner connection state of present satellite as loop-through

Yes

Can each tuner be independently tuned by TP information provided from different satellite?

No

Write tuner connection state between satellites as separate

625

Write tuner connection state between satellites as loop-through

620

End

615

630

635
Start

Set tuner connection state of each satellite 710

Set tuner connection state between the satellites by using tuner connection state of each satellite 720

End
Start

910

Can both first tuner and second tuner be tuned with use of same TP information?

Yes 920

Extract SI information from TP information inputted from each of first tuner and second tuner

915

Write as single tuner

No

925

Are the SI information identical to each other?

Yes 930

Is first tuner tuned by using TP information having different polarization properties?

No

935

Write as loop-through

Yes 940

Write as dual same

End
Start

Tune first tune and second tune to same TP information 1010

Extract SI information from TP information inputted through first tuner 1015

Tune first tune to TP information of other satellite 1020

Extract SI information from TP information inputted through second tuner 1025

Are the SI information identical to each other? 1030

No 1040

Write as single tuner

Yes 1035

Write as dual different

End
Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/KR2006/005037

International filing date: 28 November 2006 (28.11.2006)

Document type: Certified copy of priority document

Number: 10-2005-0114502
Filing date: 29 November 2005 (29.11.2005)

Date of receipt at the International Bureau: 13 December 2006 (13.12.2006)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)
This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

Application Number: 10-2005-0114502
Date of Application: NOV 29, 2005
Applicant(s): 주식회사 휴맥스

2006 년 12 월 06 일

COMMISSIONER
【서류명】 특허출원서
【권리구분】 특허
【수신처】 특허청장
【제출일자】 2005.11.29
【발명의 국문명칭】 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법
【발명의 영문명칭】 SYSTEM AND METHOD FOR CHECKING CONNECTED STATE OF SATELLITE SIGNAL LINE IN DIGITAL BROADCASTING RECEIVER
【출원인】
【명칭】 주식회사 휴맥스
【출원인코드】 1-1998-000063-1
【대리인】
【성명】 채종길
【대리인코드】 9-2000-000120-1
【포괄위임등록번호】 2004-025971-1
【발명자】
【성명】 조민행
【성명의 영문표기】 CHO Min Haeng
【주민등록번호】 751225-1695712
【우편번호】 463-811
【주소】 경기 성남시 분당구 정자동 24번지 인텔리지 B동 2603호
【국적】 KR
【심사청구】 청구
【취지】 특허법 제42조의 규정에 의한 출원, 특허법 제60조의 규정에 의한 출원심사를 청구합니다.

대리인
채종길 (인)
<table>
<thead>
<tr>
<th>내역</th>
<th>금액</th>
</tr>
</thead>
<tbody>
<tr>
<td>기본출원료</td>
<td>0 면 38,000 원</td>
</tr>
<tr>
<td>가산출원료</td>
<td>16 면 0 원</td>
</tr>
<tr>
<td>우선권주장료</td>
<td>0 건 0 원</td>
</tr>
<tr>
<td>심사청구료</td>
<td>3 항 205,000 원</td>
</tr>
<tr>
<td>합계</td>
<td>243,000 원</td>
</tr>
<tr>
<td>감면사유</td>
<td>종소기업</td>
</tr>
<tr>
<td>감면후 수수료</td>
<td>121,500 원</td>
</tr>
</tbody>
</table>

**첨부서류**: 1. 종소기업기본법시행령 제2조에의한 종소기업에 해당함을 증명하는 서류_1통
【요약서】

【요약】

본 발명은 제1 및 제2 튜너를 구비한 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법에 관한 것으로서, M(M>0)개의 검색 위성에 대한 채널 및 위성신호선의 연결 형태가 검색되어 저장된 경우에, 현재 위성(K)의 채널을 검색한 후에 제1 및 제2 튜너가 현재 위성에 대해 편과 특성이 서로 다른 위성신호와의 독립적 튜닝 여부를 확인 및 저장한 다음에, 현재 위성(K)과 검색 위성(N, 0≤N≤M)과의 세제레이트/루프-쓰루 관계를 비교 및 저장한 후에 위성에 대한 채널 및 위성신호선의 연결 상태 설정 과정을 종료한다.

【대표도】

도 5

【색인어】

디지털 방송 수신기, 위성중계기, 위성방송안테나, 튜너, 다이렉트 스위치
【명세서】

【발명의 명칭】
디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법
(System and Method for Checking Connected State of Satellite Signal Line in Digital Broadcasting Receiver)

【도면의 간단한 설명】

1. 도 1은 일반적인 디지털 방송 수신기의 연결 상태를 도시한 것이다.

2. 도 2는 본 발명의 실시예에 적용되는 디지털 방송 수신기의 구성을 도시한 것이다.

3. 도 3은 도 2의 디지털 방송 수신기와 위성의 연결 형태를 도시한 것이다.

4. 도 4는 도 2의 디지털 방송 수신기의 일부 구성요소인 2개의 튜너에 대한 연결 형태를 도시한 것이다.

5. 도 5는 본 발명의 실시예에 따른 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법의 순서도를 도시한 것이다.

【발명의 상세한 설명】

【발명의 목적】

【발명이 속하는 기술분야 및 그 분야의 종래기술】

본 발명은 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법에 관한 것으로, 특히 2개의 튜너를 갖는 디지털 방송 수신기에서 각 튜너의 위성신호
신의 연결 상태를 자동으로 설정하도록 하는 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법에 관한 것이다.

도 1은 일반적인 디지털 방송 수신기의 연결 상태를 도시한 것이다.

도 1에 도시된 바와 같이, 일반적으로 디지털 방송 수신기(30)는 디지털 방송 프로그램을 하드디스크(HDD)와 같은 대용량 기록매체에 기록 저장하는 개인 비디오 녹화(PVR, Personal Video Recording) 기능이나び터널 셔터박스(STB, Set Top Box)로서, 위성 방송 안테나(20)와 텔레비전(40)에 연결 접속될 수 있다.

위성 방송 안테나(20)는 위성(11, 12, 13)을 통해 중계되는 디지털 위성방송을 수신하기 위한 것으로, 지상에 위치한 방송국에서 송출한 송신 전파를 수신한 후에 이를 위성 내부에서 중복하여 지상으로 재송신하는 트랜스ponder(Transponder, 위성 중계기)에 의해 중계되는 디지털 위성 방송을 수신하여 디지털 방송 수신기(30)로 출력한다.

위성 방송 안테나(20)의 중앙에는 위성에서부터 송출하는 4~12GHZ대의 주파수를 1 GHz대의 주파수로 변경하는 저잡음 주파수변환기(LNB, Low Noise Block down converter)가 위치하고 있다.

디지털 방송 수신기(30)는 위성 방송 안테나(20)를 통해 수신되는 MPEG2 트랜스포트 스트림(Transport stream)의 디지털 방송 프로그램을 원래의 비디오 및 오디오 신호로 복원 및 신호 처리한 후에 그 비디오 및 오디오 신호를 텔레비전(40)을 통해 출력 표시하여, 사용자가 원하는 디지털 방송 프로그램을 시청할 수 있도록 한다.
이러한 디지털 방송 수신기(30)는 사용자가 하나의 채널을 녹화하면서 다른 채널의 시청을 자유롭게 할 수 있도록 2개의 튜너를 사용하기도 한다.

여기서, 튜너(TUNER)는 저감음 주파수변환기(LNB)에서 낮은 주파수로 변환한 신호를 받아 텔레비전(40)으로 송출하기 위해 영상신호와 음성신호로 투영하는 역할을 수행한다.

그러면, 종래 기술의 디지털 방송 수신기(30)는 각 위성신호를 수신하는 LNB의 개수에 따라 2개의 튜너를 사용하는데 있어 제한이 있다.

예를 들어, 1개의 LNB 내에서 편파(Polarization), 고대역(High band), 낮 저대역(Low band)을 선택함에 따라 특정 주파수(일레로, 수평 편파, 고대역 신호)만을 받아들여게 되면, 2개의 튜너가 모두 하나의 위성신호 내에서 특정 주파수만을 투영하게 된다.

이러한 제한 요건에 따라 디지털 방송 수신기(30)는 하나의 신호선으로 들어오는 LNB 신호를 두개의 튜너가 공유하는 루프쓰루(Loop-Through) 형태, 두개의 신호선으로 들어는 서로 다른 LNB 신호를 각각의 튜너에서 독립적으로 투영하는 세퍼레이트(Separate) 형태를 사용자가 메뉴에서 설정하도록 하고 있다.

이때, 2개의 튜너에 대한 위성신호의 연결 형태가 설정된 디지털 방송 수신기는 2개의 신호선을 통해 들어오는 LNB 신호가 동일할 경우에, 2개의 튜너에서 채널을 탐색하거나 1개의 튜너에서 찾은 채널을 다른 채널로 복사하는 기능을 제공한다.

2개의 튜너를 갖는 디지털 방송 수신기를 사용하는 일반 사용자는 튜너에 대
한 제한 조건을 이해하기 어렵고, 2개의 튜너를 루프쓰러/세퍼레이트 형태로 설정을 잘못할 경우에 2개의 튜너를 가진 제품을 제대로 활용하지 못한다는 문제점이 있다.

【발명이 이루고자 하는 기술적 과제】

본 발명이 이루고자 하는 기술적 과제는 2개의 튜너를 갖는 디지털 방송 수신기에서 각 튜너의 위성신호선의 연결 상태를 자동으로 설정하도록 하는 디지털 방송 수신기에서의 위성 신호선의 연결 상태 확인 방법을 제공하는 것이다.

【발명의 구성】

본 발명의 특징에 따른 제1 및 제2 튜너를 구비한 디지털 방송 수신기에서 위성신호선의 연결 형태에 따라 위성별 채널을 검색하는 디지털 방송 수신기에서의 위성 신호선의 연결 상태 확인 방법은, M(M>0)개의 검색 위성이 대한 채널 및 위성 신호선의 연결 형태가 검색되어 저장된 경우에, 디지털 방송 수신기가 현재 위성(K, K>M)에 대한 채널 검색 및 위성신호선의 연결 상태 설정을 시작하는 단계, 디지털 방송 수신기는 현재 위성(K)의 채널을 검색한 후에 현재 위성(K)에 대해 제1 및 제2 튜너가 상기 위성(K)에 대해 독립적 튜닝이 가능한지를 판별하여, 판별 결과에 따라 상기 위성(K)과 제1 및 제2 튜너와의 연결 상태를 저장하는 단계, 및 c) 디지털 방송 수신기는 현재 위성(K)과 검색 위성(N, 0<N<M)과의 독립적 튜닝 여부를 비교하고, 비교 결과에 따라 현재 위성(K)과 검색 위성에 대한 각 위성신호선에 대한 연결 상태를 저장한 후에 위성에 대한 채널 및 위성신호선의 연결 상태 설정 과정을 종료하는 단계를 포함한다.
위에서, 디지털 방송 수신기는 현재 위성(K)과 검색 위성(N, 0 < N < M)과의 세퍼레이트/루프-쓰루 관계를 비교하는 단계에서는 제1 및 제2 튜너로 현재 위성(K)과 검색 위성(N)이 찾은 위성중계기에서 중계되는 위성신호를 투납하여 동시에 고정이 될 경우에 현재 위성(K)과 검색 위성(N)이 세퍼레이트 관계라고 판단하고, 제1 및 제2 튜너가 동시에 고정되지 않는다면 현재 위성(K)과 검색 위성(N)은 루프-쓰루 관계라고 판단하는 것을 특징으로 한다.

아래에서는 절부한 도면을 참고로 하여 본 발명의 실시예에 대하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 상세히 설명한다. 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다.

먼저, 본 발명의 실시예에 적용되는 디지털 방송 수신기에 대하여 도 2 내지 도 4를 참고로 하여 설명한다.

도 2는 본 발명의 실시예에 적용되는 디지털 방송 수신기의 구성을 도시한 것이고, 도 3은 도 2의 디지털 방송 수신기와 위성의 연결 형태를 도시한 것이며, 도 4는 도 2의 디지털 방송 수신기의 일부 구성요소인 2개의 튜너에 대한 연결 형태를 도시한 것이다.

도 2에 나타낸 바와 같이, 디지털 방송 수신기는 제1 및 제2 튜너(11, 12), 디모듈레이터(Demodulator, 20), 디믹스(Demux, 30), 메모리(40), 디코더(Decoder, 50), 하드디스크(HDD, 70), 케이지(60), 회상 케이지(80)를 포함하지만 이에 한정 되지는 않는다.
제1 및 제2 튜너(11, 12), 디모듈레이터(20), 디렉스(30)에서는 디지털 방송 채널을 동조하여 방송 채널에 다중화된 각 서비스들을 통해 수신되는 방송 전파를 복조하여 오디오, 비디오, 및 데이터로 파싱(Parsing)하여 분리 출력하게 되고, 메모리(40)는 디렉스(30)에 의해 파싱되어 분리 출력되는 오디오, 비디오, 및 데이터를 저장한다.

디코더(50)는 메모리(40)에 저장되어 있는 오디오, 비디오, 및 데이터를 디코딩하여 원래의 오디오 및 비디오 신호로 복원 출력하고, 제어부(60)는 사용자의 요청에 따라 비디오 및 오디오 신호를 하드디스크(70)에 기록 저장하거나 디코더(50)에 의해 복원되지 않는 정보들을 하드디스크(70)에 기록하는 일련의 녹화 동작을 수행하게 된다.

또한, 제어부(60)는 튜너(11, 12), 디모듈레이터(20), 디렉스(30)의 동작을 제어하여 디지털 방송 채널을 순차적으로 튜닝하는 일련의 자동 튜닝 동작을 제어한다.

화상 제어부(80)는 디코더(50)에서 복원 출력되는 비디오 및 오디오 신호를 오디오/비디오 출력하거나, OSD(On Screen Display) 출력한다. 이때, OSD는 사용자가 알아야 하거나 필요로 하는 정보를 별도의 영상 신호 입력 없이 모니터 자체적으로 화면상에 표시하는 것을 의미한다.

이러한 디지털 방송 수신기에서 위성신호선의 연결 형태는 신호선의 개수에 따라 분류될 수 있는데, 스위치 없이 위성 신호를 바로 디지털 방송 수신기에 연결하는 형태, 도 3의 (a)에 도시된 바와 같이 신호선이 1개일 경우에 위성신호를 수
신하는 LNB 개수에 따라 다이색(Digital Satellite Equipment Control, DiSEqC) 스위치(S11)를 연결하여 한번에 하나의 신호만을 연결하는 형태, 도 3의 (b)에 도시된 바와 같이 신호선이 2개일 경우에 2개의 다이색 스위치(S21, S22)에 동일한 위성 신호 또는 서로 다른 위성 신호를 연결하는 형태가 있다.

일례로 신호선이 2개일 경우에, 제1 스위치(S21)에는 위성1, 위성2, 위성3의 위성신호가 연결되고, 제2 스위치(S22)에는 위성1, 위성4, 위성5가 연결될 수 있다.

도 4의 (a)에 도시된 바와 같이, 신호선이 1개일 경우에는 루프쓰루 형태의 제1 및 제2 튜너(11, 12)에 동일한 신호가 입력된다. 즉, 제1 튜너(11, 12)의 출력 단자가 제2 튜너(11, 12)의 입력 단자가 연결되어 있어 위성신호가 제1 튜너(11, 12)의 입력 단자에 입력된 후 튜닝되어 제2 튜너(11, 12)의 출력단자가 출력된다.

도 4의 (b)에 도시된 바와 같이, 신호선이 2개일 경우에는 씽피레이트 형태의 제1 및 제2 튜너(11, 12)의 입력 단자에 각각의 신호선1, 신호선2가 연결되어 있어, 제1 및 제2 튜너(11, 12)는 독립적 튜닝이 가능하다.

본 발명의 실시예에서는 제어부(60)가 자동 튜닝 동작을 수행하는 과정에서 위성신호선의 연결 상태에 대해 소프트웨어를 별도로 설정할 필요 없이 자동으로 튜너와 위성신호선과의 연결 상태에 따라 위성의 채널 검색 과정이 이루어진다.

다음, 도 5를 참조하여 본 발명의 실시예에 따른 시스템의 동작에 대하여 자세하게 설명한다.

도 5는 본 발명의 실시예에 따른 디지털 방송 수신기에서의 위성신호선의 연
결 상태 확인 방법의 순서도를 도시한 것이다.

위성 중개기(Transponder, TP)를 통해 중계되는 디지털 위성 방송 신호를 위성 방송 안테나에서 수신하여 디지털 방송 수신기에 전달하면, 디지털 방송 수신기의 제어부(60)는 자동 튜닝 동작을 수행하여 현재 위성에 대해 채널 검색을 수행하고, 현재 위성에 대한 위성신호선의 연결 상태를 파악하게 된다.

도 5를 참조하면, 본 발명의 실시예에 따른 디지털 방송 수신기에서의 위성 신호선 연결 상태 확인 방법은, 먼저 제어부(60)가 M(M>0)개의 검색 위성에 대한 채널 및 위성신호선의 연결 상태를 미리 검색하여 메모리(40)에 저장해 두었다고 가정한다.

다음, 사용자 또는 디지털 방송 수신기에서 채널 검색 또는 위성 상태 점검(Diagnosis) 메뉴를 통해 위성 방송 안테나의 변경 사항이나 특정한 위성에 대한 위성신호선의 연결 상태의 재확인을 요청하면, 제어부(60)는 위성신호선의 연결 상태를 확인하여 현재 위성(K, K>M)의 채널을 검색한다.(S1, S2)

제어부(60)는 현재 위성(K)이 편과 특성이 서로 다른 위성중개기에서 송신되는 위성신호에 대해 제1 및 제2 튜너(11, 12)가 모두 고정(Lock)이 가능한지를 판별한다.(S3)

이때, 제어부(60)는 편과 특성이 서로 다른 2개의 위성 중개기(TP)에서 중계되는 위성 신호를 제1 및 제2 튜너(11, 12)로 튜닝하였을 때, 제1 및 제2 튜너(11, 12)가 모두 고정(lock)이 되면 현재 위성에 대해 제1 및 제2 튜너(11, 12)가 세피레이트 형태로서 독립적 튜닝 동작이 가능함을 메모리(40)에 기록하고, 1 및 제2
튜너(11, 12)가 모두 고정되지 않을 경우에 현재 위성에 대해 제1 및 제2 튜너(11, 12)가 루프-쓰루 형태로 동작 가능함을 메모리(40)에 기록한다. (S4, S5)

그 후, 제어부(60)는 현재 위성과 사전에 검색된 검색 위성(1~M)과의 독립적 튜닝 가능 여부를 확인하여 세퍼레이트/루프-쓰루 관계를 비교한다. (S6)

제어부(60)는 각 튜너(11, 12)별 검색 위성(N, 0≤N≤M)과의 독립적 튜닝 가능 여부를 판단하는데, 이는 현재 위성(K)과 검색 위성(N)에 대한 위성신호선이 동일한 스위치에 의해 연결될 경우에 제1 및 제2 튜너(11, 12)에서 독립적으로 튜닝 할 수 없기 때문이다. (S7)

따라서, 제어부(60)는 현재 위성(K)과 검색 위성(N)이 찾은 위성중계기에서 중계되는 위성신호를 제1 및 제2 튜너(11, 12)로 튜닝하여 동시에 고정이 될 경우에 현재 위성(K)과 검색 위성(N)이 세퍼레이트 관계라고 판단한다. (S8)

위와 반대로, 제1 및 제2 튜너(11, 12)가 동시에 고정되지 않는다면, 현재 위성(K)과 검색 위성(N)은 루프-쓰루 관계라고 판단한다. (S9)

제어부(60)는 S6 단계-S9단계를 통해 현재 위성과 검색 위성(1~M)에 대한 세퍼레이트/루프쓰루 관계를 모두 비교한 경우에, 특정 위성에 대한 채널 및 위성신호선의 연결 상태 설정 과정을 종료한다. (S10, S11)

상기 도면과 발명의 상세한 설명은 단지 본 발명의 예시적인 것으로서, 이는 단지 본 발명을 설명하기 위한 목적에서 사용된 것이지 의미한정이나 특허청구범위에 기재된 본 발명의 범위를 제한하기 위하여 사용된 것은 아니다. 그러므로 본 기술 분야의 통상의 지식을 가진 자라면 이로부터 다양한 변경 및 균등한 타 실시에
가 가능하다는 점을 이해할 것이다. 따라서, 본 발명의 진정한 기술적 보호 범위는
첨부된 특허청구범위의 기술적 사상에 의해 정해져야 할 것이다.

【발명의 효과】

이와 같이, 본 발명에 의한 디지털 방송 수신기에서의 위성신호선의 연결 상태
확인 방법은 2개의 튜너를 갖는 디지털 방송 수신기에서 각 튜너의 위성신호선
의 연결 상태를 자동으로 진단하여 사용자가 별도로 각 튜너의 연결 형태를 설정하
야 하는 불편함을 해소하고, 안테나의 변경 사항이나 특정한 위성의 상태가 좋지
않은 경우에 신호선의 연결 상태를 확인할 수 있는 효과가 있다.
【특허청구범위】

【청구항 1】

제1 및 제2 튜너를 구비한 디지털 방송 수신기에서 위성신호선의 연결 형태에 따라 위성별 채널을 검색하는 방법에 있어서,

a) M(M>0)개의 검색 위성에 대한 채널 및 위성신호선의 연결 형태가 검색되어 저장된 경우에, 상기 디지털 방송 수신기가 현재 위성(K, K>M)에 대한 채널 검색 및 위성신호선의 연결 상태 설정을 시작하는 단계;

b) 상기 디지털 방송 수신기는 현재 위성(K)의 채널을 검색한 후에 현재 위성(K)에 대해 상기 제1 및 제2 튜너가 상기 위성(K)에 대해 독립적 튜닝이 가능한 지를 판별하여, 상기 판별 결과에 따라 상기 위성(K)과 제1 및 제2 튜너와의 연결 상태를 저장하는 단계; 및

c) 상기 디지털 방송 수신기는 현재 위성(K)과 검색 위성(N, 0<N<M)과의 독립적 튜닝 여부를 비교하고, 상기 비교 결과에 따라 현재 위성(K)과 검색 위성에 대한 각 위성신호선에 대한 연결 상태를 저장한 후에 상기 위성에 대한 채널 및 위성신호선의 연결 상태 설정 과정을 종료하는 단계

을 포함하는 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법.

【청구항 2】

제1항에 있어서,

상기 b) 단계는,
상기 디지털 방송 수신기가 된과 특성이 다른 2개의 위성 중계기(TP)에서 중
계되는 위성 신호를 제1 및 제2 튜너로 투영하였을 때, 상기 제1 및 제2 튜너가 동
시에 고장(LoCk)이 되면 세퍼레이트(Separate) 형태로 판단하고, 상기 제1 및 제2
튜너가 모두 고정되지 않으면 루프-쓰루(Loop-through) 형태로 판단하는 것을 특징
으로 하는 디지털 방송 수신기에서의 위성신호선의 연결 상태 확인 방법.

【청구항 3】

제1항에 있어서,

상기 c) 단계는,

상기 디지털 방송 수신기는 상기 제1 및 제2 튜너로 현재 위성(K)과 검색 위
성(N)이 찾은 위성중계기에서 중계되는 위성신호를 투영하여 동시에 고정이 될 경
우에 현재 위성(K)과 검색 위성(N)이 세퍼레이트 관계라고 판단하고, 상기 제1 및
제2 튜너가 동시에 고정되지 않는다면 현재 위성(K)과 검색 위성(N)은 루프-쓰루
관계라고 판단하는 것을 특징으로 하는 디지털 방송 수신기에서의 위성신호선의 연
결 상태 확인 방법.
【도 3a】

위성 1  ...  위성 M

스위치  \( S_{11} \)

신호선

【도 3b】

위성 1  ...  위성 L

위성 1  ...  위성 M

스위치  \( S_{21} \)

신호선 1

스위치  \( S_{22} \)

신호선 2

【도 4】

(a) 트 diferen 체계

신호선 1

(b) 세퍼레이트 형태

신호선 1

신호선 2

cut

18-17
Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/KR2006/005037

International filing date: 28 November 2006 (28.11.2006)

Document type: Certified copy of priority document

Number: 10-2006-0112126
Filing date: 14 November 2006 (14.11.2006)

Date of receipt at the International Bureau: 13 December 2006 (13.12.2006)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)
This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

출원번호: 10-2006-0112126
Application Number

출원일자: 2006년 11월 14일
Date of Application: NOV 14, 2006

출원인: 주식회사 휴맥스
Applicant(s)

2006년 12월 06일

COMMISSIONER
【서류명】 특허출원서
【관리구분】 특허
【수신처】 특허청장
【제출일자】 2006.11.14
【발명의 국문명칭】 듀얼 튜너의 연결 상태 설정 방법 및 장치
【발명의 영문명칭】 Method and device for setting connection type of dual tuner

【출원인】
【명칭】 주식회사 휴맥스
【출원인코드】 1-1998-000063-1

【대리인】
【성명】 이경란
【대리인코드】 9-1998-000651-6
【포괄위임등록번호】 2004-073908-7

【발명자】
【성명】 김준형
【성명의 영문표기】 Kim JunHyung
【주민등록번호】 760222-1671221
【우편번호】 463-500
【주소】 경기 성남시 분당구 구미동 187-3 세종그랑시아 1동 207호
【국적】 KR

【발명자】
【성명】 이호
【성명의 영문표기】 Yi, Ho
【주민등록번호】 791225-1574214
【우편번호】 463-500
【주소】 경기 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)

【수수료】
【기본출원료】 0 면 38,000 원
【가산출원료】 47 면 0 원
【우선권주장료】 0 건 0 원
【심사청구료】 26 항 941,000 원
【합계】 979,000 원
【요약서】

【요약】

본 발명은 둘릴 트너의 연결 상태 설정 방법 및 장치에 관한 것이다. 본 발명의 일 실시예에 따르면, 복수의 트너를 구비한 디지털 방송 수신기에서 하나 이상의 안테나에 연결된 n(임의의 자연수)개의 위성에 대한 트너 연결 상태를 설정하는 방법에 있어서, 각 위성으로부터 입력된 위성 신호를 이용하여 각각의 위성에 대한 상기 트너의 연결 상태를 설정하는 단계; 및 각각의 위성에 대해 설정된 연결 상태와 각 위성들로부터 입력된 위성 신호를 이용하여 각 위성간의 상기 트너의 연결 상태를 설정하는 단계를 포함하는 연결 상태 설정 방법이 제공될 수 있다. 따라서 본 발명에 의해, 2개의 트너를 갖는 디지털 방송 수신기에서 각 트너의 위성신호선의 연결 상태를 자동으로 설정하도록 할 수 있다.

【대표도】

도 2

【색인어】

디지털 방송 수신기, 셋탑 박스, STB, 트너
【명세서】

【발명의 명칭】

듀얼 튜너의 연결 상태 설정 방법 및 장치(Method and device for setting connection type of dual tuner)

【도면의 간단한 설명】

<1> 도 1은 일반적인 디지털 방송 수신기의 연결 상태를 개략적으로 예시한 도면.

<2> 도 2는 본 발명의 일 실시예에 따른 디지털 방송 수신기의 내부 기능 구성의 간략하게 예시한 블록도.

<3> 도 3 및 도 4는 디지털 방송 수신기와 위성의 연결 형태를 도시한 도면.

<4> 도 5는 디지털 방송 수신기의 2개의 튜너의 연결 형태를 예시한 도면.

<5> 도 6은 본 발명의 일 실시예에 따른 디지털 방송 수신기가 위성 신호선의 연결 상태를 확인하는 방법을 나타낸 순서도.

<6> 도 7은 본 발명의 일 실시예에 따른 N개의 안테나에 대한 연결 상태 확인을 위한 상태 표.

<7> 도 8은 본 발명의 일 실시예에 각각의 안테나에 대한 상기 튜너의 연결 상태를 설정하는 방법을 나타낸 순서도.

<8> 도 9는 본 발명의 일 실시예에 따른 각 위성간의 연결 상태를 설정하는 방법을 나타낸 순서도.
<9>  <도면의 주요 부분에 대한 부호의 설명>

<10>  210a, 210b : 제1 튜너, 제2 튜너

<11>  215 : 디모듈레이터(demodulator)

<12>  220 : 디믹스(demux)

<13>  225 : 디코더(decoder)

<14>  230 : 데이터 출력부

<15>  235 : 메모리

<16>  240 : 재어부

【발명의 상세한 설명】

【발명의 목적】

【발명이 속하는 기술분야 및 그 분야의 종래기술】

본 발명은 디지털 방송 수신기에 관한 것으로, 특히 2개의 튜너를 갖는 디지털 방송 수신기에서 N개의 위성간의 튜너의 연결 상태를 설정하는 방법 및 장치에 관한 것이다.

최근에는 디지털 TV 또는 � Bent 박스(STB: set top box) 등과 같은 디지털 방송 수신기가 널리 보급되어 상용화되고 있다. 이와 같은 일반적인 디지털 방송 수신기는 도 1에 예시된 바와 같이, 디지털 방송 프로그램을 하드디스크(HDD)와 같은
대용량 기록매체에 기록 저장하는 개인 비디오 녹화 (PVR, Personal Video Recoding) 기능이 구현된 셋탑 박스로써 위성 방송 안테나(20)와 텔레비전(40)에 연결 접속된다.

위성 방송 안테나(20)는 복수의 위성을 통해 중계되는 디지털 위성 방송을 수신하기 위한 것으로, 지상에 위치한 방송국에서 송출한 송신 전파를 수신한 후에 이를 위성 내부에서 중복하여 지상으로 재송신하는 트랜스폰더 (Transponder, 위성 중계기)에 의해 중계되는 디지털 위성 방송을 수신하여 디지털 방송 수신기(30)로 출력한다.

위성 방송 안테나(20)의 중앙에는 위성에서부터 송출하는 4~12GHZ대의 주파수를 1GHZ대의 주파수로 변경하는 저잡음 주파수변환기 (LNB, Low Noise Block down converter)가 위치하고 있다.

디지털 방송 수신기(30)는 위성 방송 안테나(20)를 통해 수신되는 MPEG2 트랜스포트 스트림 (Transport stream)의 디지털 방송 프로그램의 원래의 비디오 및 오디오 신호로 복원 및 신호 처리한 후에 그 비디오 및 오디오 신호를 텔레비전 (40)을 통해 출력 표시하여, 사용자가 원하는 디지털 방송 프로그램을 시청할 수 있도록 한다.

이러한 디지털 방송 수신기(30)는 사용자가 하나의 채널을 녹화하면서 다른 채널의 시청을 자유롭게 할 수 있도록 2개의 튜너를 사용하기도 한다. 여기서, 튜너 (TUNER)는 저잡음 주파수변환기 (LNB)를 통해 입력되는 위성 신호에서 미리 설정된 특정 주파수의 신호로 튜닝하는 기능을 수행한다.
그런데, 종래 기술의 디지털 방송 수신기(30)는 각 위성신호를 수신하는 LNB의 개수에 따라 2개의 튜너를 사용하는데 있어 제한이 있다.

예를 들어 1개의 LNB 내에서 편파(Polarization), 고대역(High band), 및 저대역(Low band)을 선택함에 따라 특정 주파수(일례로, 수평 편파, 고대역 신호)만을 받아들여져 되면, 2개의 튜너가 모두 하나의 위성신호 내에서 특정 주파수만을 튜닝하게 된다.

이러한 제한 요건에 따라 디지털 방송 수신기(30)는 하나의 신호선으로 들어오는 LNB 신호를 두개의 튜너가 공유하는 루프스루(Loop-Through) 형태, 두개의 신호선으로 들어는 서로 다른 LNB 신호를 각각의 튜너에서 독립적으로 튜닝하는 세퍼레이트(Separate) 형태를 사용자가 메뉴에서 설정하도록 하고 있다.

이때, 2개의 튜너에 대한 위성신호의 연결 형태가 설정된 디지털 방송 수신기는 2개의 신호선을 통해 들어오는 LNB 신호가 동일할 경우에, 2개의 튜너에서 채널을 탐색하거나 1개의 튜너에서 채널을 찾은 채널을 다른 채널로 복사하는 기능을 제공한다.

2개의 튜너를 갖는 디지털 방송 수신기를 사용하는 일반 사용자는 튜너에 대한 제한 조건을 이해하기 어렵고, 2개의 튜너를 루프스루/세퍼레이트 형태로 설정을 잘못할 경우에 2개의 튜너를 가진 제품을 제대로 활용하지 못한다는 문제점이 있다.

【발명이 이루고자 하는 기술적 과제】
따라서, 상술한 문제점을 해결하기 위한 본 발명의 목적은 2개의 튜너를 갖는 디지털 방송 수신기에서 각 튜너의 위성신호선의 연결 상태를 자동으로 설정하도록 할 수 있는 위성신호선의 연결 상태 설정 방법 및 장치를 제공하는 것이다.

본 발명의 다른 목적은 설치가 복잡한 각 튜너의 위성신호선의 연결 상태를 자동으로 설정하도록 함으로써 사용자의 편의를 증진시킬 수 있는 위성신호선의 연결 상태 설정 방법 및 장치를 제공하는 것이다.

본 발명의 또 다른 목적은 디지털(DiSEqC : Digital satellite equipment control) 스위치를 사용하는 경우 서로 다른 위성에 동일한 TP 정보를 가점으로 인해 발생하게 발생되는 튜너 설정의 오류 가능성을 줄일 수 있는 위성신호선의 연결 상태 설정 방법 및 장치를 제공하는 것이다.

본 발명의 또 다른 목적은 각 튜너의 연결 상태를 싱글 타입, 루프쓰루(loop through) 타입, 듀얼 셀(dual same) 타입, 듀얼 디퍼런트(dual different) 타입 중 어느 하나로 설정할 수 있는 위성신호선의 연결 상태 설정 방법 및 장치를 제공하는 것이다.

본 발명의 또 다른 목적은 위성간의 튜너 연결 상태를 설정함으로써 녹화 또는 시청 예약된 채널들에 새로운 채널을 추가할 때 튜너의 연결 상태를 미리 파악할 수 있어 예약 목록에 추가 가능한지 여부를 미리 인식할 수 있도록 함으로써 사용자의 편의성을 증진시킬 수 있는 위성신호선의 연결 상태 설정 방법 및 장치를 제공하는 것이다.
이의 본 발명의 목적들은 하기의 실시예에 대한 설명을 통해 쉽게 이해될 수 있을 것이다.

【발명의 구성】

상술한 목적을 달성하기 위하여, 본 발명의 일 실시예에 따르면, 복수의 튜너를 구비한 디지털 방송 수신기에서 하나 이상의 안테나에 연결된 n(임의의 자연수)개의 위성에 대한 튜너 연결 상태를 설정하는 방법이 제공된다.

본 발명의 일 실시예에 따르면, 복수의 튜너를 구비한 디지털 방송 수신기에 서 하나 이상의 안테나에 연결된 n(임의의 자연수)개의 위성에 대한 튜너 연결 상태를 설정하는 방법에 있어서, 각 위성으로부터 입력된 위성 신호를 이용하여 각각의 위성에 대한 상기 튜너의 연결 상태를 설정하는 단계적 및 각각의 위성에 대해 설정된 연결 상태와 각 위성들로부터 입력된 위성 신호를 이용하여 각 위성간의 상기 튜너의 연결 상태를 설정하는 단계를 포함하는 연결 상태 설정 방법이 제공될 수 있다.

상기 각 위성은 하나의 안테나 정보를 갖으며, 상기 안테나 정보는 LNB(Low Noise Block down converter) 정보, 22Khz Tone 정보, 위성 정보 및 다이렉트 (Diseqc) 스위치 입력 정보 중 하나 이상의 정보를 포함할 수 있다.

각각의 위성에 대한 상기 튜너의 연결 상태를 설정하는 단계는, 임의의 하나의 위성에서 수신된 제1 위성 신호로 제1 튜너와 제2 튜너를 각각 튜닝하여 제1 및 제2 튜너가 각각 튜닝되었는지 여부를 판단하는 단계: 상기 제1 및 제2 튜너가 각
각 튜닝된 경우, 상기 제1 및 제2 튜너를 통해 입력된 상기 제1 위성 신호로부터 각각 PSI 또는 SI 정보를 추출하여 동일한지 여부를 판단하는 단계; 상기 각 PSI 또는 SI 정보가 동일하다고 결정되면, 상기 제1 또는 제2 튜너 중 어느 하나로 상기 제1 위성 신호와 편과 특성이 다른 제2 위성 신호로 튜닝하는 단계; 및 상기 제1 위성 신호와 상기 제2 위성 신호에 의해 상기 제1 및 제2 튜너가 각각 튜닝된 경우, 상기 위성의 연결 상태를 듀얼 세일(dual same)으로 설정하는 단계를 포함할 수 있다.

상기 제1 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나가 튜닝되지 않은 경우, 상기 위성의 연결 상태를 싱글 튜너(single tuner)로 설정하는 단계를 더 포함할 수 있다.

상기 제1 위성 신호로부터 획득된 각 PSI 또는 SI 정보가 동일하지 않은 경우, 상기 위성의 연결 상태를 싱글 튜너로 설정하는 단계를 더 포함할 수 있다.

상기 제2 위성 신호에 의해 상기 제1 및 제2 튜너 중 어느 하나가 튜닝된 후 다른 튜너의 연결이 끊어진 경우, 상기 위성의 연결 상태를 루프스루(loop through)로 설정하는 단계를 더 포함할 수 있다.

각각의 위성에 대해 설정된 연결 상태를 이용하여 각 위성간의 상기 튜너의 연결 상태를 설정하는 단계는, 제1 튜너와 제2 튜너를 제3 위성 신호로 각각 튜닝하는 단계; 상기 제1 튜너를 통해 입력된 상기 제3 위성 신호에서 제1 PSI 또는 SI 정보를 추출하는 단계; 상기 제1 튜너를 상기 제3 위성 신호와는 다른 위성의 신호인 제4 위성 신호로 튜닝하는 단계; 상기 제2 튜너를 통해 입력된 상기 제3 위성
신호에서 제2 PSI 또는 SI 정보를 추출하는 단계: 상기 추출된 제1 및 제2 PSI 또는 SI 정보가 동일한지 여부를 판단하는 단계: 및 만일 동일하다고 결론되면, 각 위성간의 연결 상태를 듀얼 디퍼런트(dual different)로 설정하는 단계를 포함할 수 있다.

만일 상기 제1 및 제2 PSI 또는 SI 정보가 동일하지 않다고 판단되면, 각 위성간의 연결 상태를 싱글 튜너로 설정하는 단계를 더 포함할 수 있다.

제1 위성의 연결 상태가 제1 싱글 튜너이고, 제2 위성의 연결 상태가 제1 싱글 튜너이면, 상기 제1 위성과 제2 위성간의 연결 상태는 제1 싱글 튜너로 설정하는 단계를 더 포함할 수 있다.

제1 위성의 연결 상태가 루프스루이고, 제2 위성의 연결 상태가 듀얼 세임이면, 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 디퍼런트로 설정하는 단계를 더 포함할 수 있다.

제1 위성의 연결 상태가 듀얼 세임이고 제2 위성의 연결 상태가 듀얼 세임이면, 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 세임으로 설정하는 단계를 더 포함할 수 있다.

제1 위성의 연결 상태가 제1 및 제2 싱글 튜너 중 어느 하나이고 제2 위성의 연결 상태가 듀얼 세임이면 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 디퍼런트로 설정하는 단계를 더 포함할 수 있다.

제1 위성의 연결 상태가 제1 싱글 튜너이고, 제2 위성의 연결 상태가 제2 싱글 튜너이면, 상기 제1 위성과 상기 제2 위성간의 연결 상태를 듀얼 디퍼런트로 설
본 발명의 다른 측면에 따르면, 블록의 트너를 구비한 디지털 방송 수신기에
서 하나 이상의 안테나에 연결된 n(임의의 자연수)개의 위성에 대한 트너 연결 상태를 설정할 수 있는 디지털 방송 수신기가 제공된다.

본 발명의 일 실시예에 따르면, 각 안테나로부터 임의의 위성에서 송신된 위성 신호를 입력받는 블록의 트너: 상기 위성 신호를 복조하는 디모듈레이터: 상기 복조된 위성 신호를 데이터 유형에 따라 분류하여 출력하는 디믹스: 상기 디믹스에 의해 분리된 각각의 데이터를 복호하는 디코더: 및 상기 트너를 통해 입력된 상기 위성 신호를 이용하여 N(임의의 자연수)개의 위성에 상응하는 트너 연결 상태를 설정하는 제어부를 포함하되, 상기 제어부는 각각의 위성(각 위성은 하나의 안테나 정보를 갖음)에 대한 트너의 연결 상태를 설정한 후 각 위성에 대해 설정된 연결 상태를 이용하여 각 위성간의 트너 연결 상태를 설정하는 것을 특정으로 하는 디지털 방송 수신기가 제공될 수 있다.

상기 각 위성간 설정된 트너 연결 상태를 저장하는 메모리를 더 포함할 수 있다.

상기 제어부는 임의의 위성을 통해 수신된 제5 위성 신호를 이용하여 제1 트너와 제2 트너를 각각 트닝하여 제1 및 제2 트너 중 어느 하나가 트닝되지 않으면 상기 위성의 트너 연결 상태를 상급 트너로 설정할 수 있다.

상기 제어부는 제5 위성 신호로 상기 제1 및 제2 트너가 각각 트닝되면, 상
기 제1 및 제2 튜너로부터 각각 PSI 또는 SI 정보를 추출하여 동일한지 여부를 판단한 후 동일하다고 결정되면, 상기 제5 위성 신호와는 다른 위성의 신호인 제6 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나를 튜닝한 후 상기 제5 및 제6 위성 신호에 의해 상기 제1 및 제2 튜너가 각각 튜닝된 경우 상기 위성의 튜너 연결 상태를 듀얼 세임으로 설정할 수 있다.

상기 제6 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나를 튜닝한 후 상기 제1 및 제2 튜너 중 어느 하나가 튜닝되지 않은 경우 상기 위성의 튜너 연결 상태를 루프쓰루로 설정할 수 있다.

상기 제1 및 제2 튜너로부터 각각 PSI 또는 SI 정보를 획득하여 동일한지 여부를 판단한 후 동일하지 않다고 결정되면 상기 위성의 튜너 연결 상태를 싱글 튜너로 설정할 수 있다.

상기 제어부는 제3 및 제4 위성의 연결 상태가 각각 제1 싱글 튜너이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 제1 싱글 튜너로 설정하며, 상기 제3 및 제4 위성의 연결 상태가 각각 제2 싱글 튜너이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 제2 싱글 튜너로 설정할 수 있다.

상기 제어부는 제3 위성의 연결 상태가 제1 및 제2 싱글 튜너 중 어느 하나이고, 제4 위성의 연결 상태가 제1 및 제2 싱글 튜너 중 다른 하나이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

상기 제어부는 제3 위성의 연결 상태가 제1 싱글 튜너, 제2 싱글 튜너 및 루프쓰루 중 어느 하나이고, 제4 위성의 연결 상태가 듀얼 세임이면, 상기 제3 및 제
4 위성간의 트너 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

상기 제어부는 제3 위성의 연결 상태가 듀얼 셰어이고 제4 위성(y)의 연결 상태가 듀얼 셰어이면, 상기 제3 및 제4 위성간의 트너 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

상기 제어부는 제3 위성의 연결 상태가 제1 및 제2 성글 트너 중 어느 하나이고, 제4 위성의 연결 상태가 루프쓰주어면, 상기 제3 및 제4 위성간의 트너 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

상기 제어부는 제3 위성 및 제4 위성의 연결 상태가 각각 루프쓰주어면, 제1 트너 및 제2 트너가 상기 제3 위성 및 제4 위성에 의해 동시에 독립적으로 트닝이 가능한지 여부를 판단하여 동시에 독립적 트닝이 가능하면, 상기 제3 및 제4 위성간의 트너 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

상기 제어부는 상기 제1 트너와 상기 제2 트너가 상기 제3 위성 및 제4 위성에 의해 동시에 독립적으로 트닝이 가능하지 않으면 상기 제3 위성 및 제4 위성간의 트너 연결 상태를 성글 트너로 설정할 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, 균등물 내지 대체물을 포함하는 것으로 이해되어야 한다. 각 도면을 설명하면서 유사한 참조부호를 유사한 구성요소

49-14
이하, 첨부한 도면들을 참조하여, 본 발명의 바람직한 실시예를 보다 상세하게 설명하고자 한다. 이하, 도면상의 동일한 구성요소에 대해서는 동일한 참조부호를 사용하고 동일한 구성요소에 대해서 중복된 설명은 생략한다. 또한, 본 발명은 설명함에 있어서 관련된 공지 기술에 대한 구체적인 설명이 본 발명의 요지를 불필요하게 흐릴 수 있다고 판단되는 경우 그 상세한 설명을 생략한다.

도 2는 본 발명의 일 실시예에 따른 디지털 방송 수신기의 내부 기능 구성을 간략하게 예시한 블록도이며, 도 3 및 도 4는 디지털 방송 수신기와 위성의 연결 형태를 도시한 도면이고, 도 5는 디지털 방송 수신기의 2개의 튜너의 연결 형태를 예시한 도면이다.

도 2를 참조하면, 본 발명에 따른 디지털 방송 수신기(200)는 튜너(210a, 210b), 디모듈레이터(215), 디믹스(220), 디코더(225), 데이터 출력부(230), 메모리(235) 및 제어부(240)를 포함하여 구성된다. 이하, 도 2에는 2개의 튜너만 구비된 것을 가정하여 도시하였으나, 실제로는 수량으로 구현될 수도 있으므로 당연하다. 따라서, 도 1에는 디믹스(220), 디코더(225)가 각각 하나씩 구성되는 것으로도 도시되어 있으나, 구현 방법에 따라 튜너의 개수와 동일하게 각각 구비될 수도 있다.

디모듈레이터(215)는 제어부(240)의 제어에 의해 튜너(210a, 210b)를 통해 입력된 신호(즉, 전파 신호)를 복조하여 디믹스(220)로 전달하는 기능을 수행한다.

디믹스(220)는 디모듈레이터(215)에 의해 복조되어 입력된 오디오, 비디오
및 데이터를 파싱(parsing)하여 각각의 데이터에 유형에 상응하여 분리하고 각각 디코더(225)로 출력하는 기능을 수행한다. 도면에는 하나의 디코더만 구성되는 것으로 도시되어 있으나, 디코더(255)가 각각 수행하는 기능에 따라 비디오 디코더, 오디오 디코더, 정보 디코더 등으로 구체화될 수 있음을 당연하다. 여기서, 데이터 유형은 비디오 데이터, 오디오 데이터, 정보 데이터일 수 있다.

디코더(225)는 제어부(240)의 제어에 의해 디코딩(decoding)하여 원래의 오디오 신호, 비디오 신호 및 데이터 신호 (이하, 이에와 설명의 편의를 위해 "정보 데이터"라 정하기로 함)를 복원한다. 그리고, 디코더(225)는 제어부(240)의 제어에 의해 각각의 데이터를 데이터 출력부(230)를 통해 출력하거나 메모리(235)에 저장하는 기능을 수행한다. 도 2에서는 하나의 디코더(225)가 비디오, 오디오 및 정보 데이터를 디코딩하는 것으로 도시되어 있으나 각각의 데이터를 디코딩하기 위해 디코더(예를 들어, 비디오 디코더, 오디오 디코더, 정보 데이터 디코더 등)를 구비할 수 있다.

메모리(235)는 회발성 메모리 및 비회발성 메모리를 포함할 수 있다. 그리고, 메모리(235)는 디코더(225)에 의해 복호된 각각의 비디오 데이터, 오디오 데이터 및 정보 데이터가 제어부(240)의 제어에 의해 기록된다. 또한, 메모리(235)는 본 발명에 따른 디지털 방송 수신기(200)를 운용하기 위한 알고리즘 저장된다.

데이터 출력부(230)는 제어부(240)의 제어에 의해 메모리(235)에 저장된 비
디오 또는/또는 오디오 데이터를 출력하거나 정보 데이터를 OSD(on screen display) 형식으로 출력하는 기능을 수행한다. 여기서, OSD는 사용자에 필요한 정보를 별도의 영상 신호 입력 없이 데이터 출력부(230)와 연결된 디스플레이 장치(예를 들어, 모니터, 텔레비전 등) 자체적으로 화면상에 표시하는 것을 의미한다. 물론, 데이터 출력부(230)는 제어부(240)의 제어에 의해 디코더(225)에서 복호된 각각의 데이터를 디스플레이 장치로 출력할 수도 있다.

제어부(240)는 본 발명에 따른 디지털 방송 수신기(200)의 내부 구성 요소들(예를 들어, 튜너(210a, 210b), 디모듈레이터(215), 디믹스(220), 디코더(225), 데이터 출력부(230), 메모리(235) 등)을 제어하는 기능을 수행한다.

또한, 제어부(240)는 각각의 튜너(210a, 210b)의 위성 신호선의 연결 형태에 따른 각 위성의 연결 상태를 감지하고 설정할 수 있다. 이에 대해서는 하기에서 관련 도면을 참조하여 상세히 설명하기로 한다.

일반적으로 디지털 방송 수신기에서 위성 신호선의 연결 형태는 신호선의 개수에 따라 분류될 수 있다. 즉, 도 3에서 예시된 바와 같이 신호선이 1개일 경우 위성신호를 수신하는 LNB 개수에 따라 다이렉트(DiSEqC: digital satellite equipment control) 스위치(미드시)를 연결하여 한번에 하나의 신호만을 연결하는 형태와 도 4에 도시된 바와 같이 신호선이 2개일 경우 2개의 다이렉트 스위치에 동일한 위성 신호 또는 서로 다른 위성 신호를 연결하는 형태로 분류될 수 있다. 여기서, 다이렉트 스위치는 하나의 위성수신기로 여러 개의 위성 안테나를 자동으로 선택해주는 기기이다. 일반적으로 수신기 하나로 안테나 4개까지 수신이 가능하며, 편
파로는 8개의 편파까지 가능하다.

우선, 이해와 설명의 편의를 위해, 각 튜너에 위치 신호선이 물리적으로 연결된 형태에 따른 연결 형태에 대해 간략하게 설명하기로 한다. 이하에는 튜너가 두개인 경우를 기준으로 설명하기로 한다.

도 5의 (a)에 도시된 바와 같이, 두개의 튜너(210α, 210b) 중 어느 하나의 튜너(210α)만 위성 신호선을 연결하여 사용하는 경우의 연결 형태를 "싱글 튜너"라 정한다. 즉, 싱글 튜너는 두개의 튜너 중 어느 하나의 튜너만 사용하는 형태를 정한다. 편의상 제1 튜너(210α - 도 2 참조)만 위성 신호선을 연결하여 사용하는 경우의 연결 형태를 "제1 싱글 튜너"라 정하며, 제2 튜너(210b - 도 2 참조)만 위성 신호선을 연결하여 사용하는 경우의 연결 형태를 "제2 싱글 튜너"라 정하기로 한다.

도 5의 (b)에 보여지는 바와 같이, 튜너(210α, 210b)에 연결된 위성 신호선이 1개이며, 제1 튜너(210α)와 제2 튜너(210b)에 동일한 위성 신호가 입력되는 연결 형태를 "루프스루(loop through)"라 정한다. 즉 루프스루의 연결 형태의 경우, 제1 튜너(210α)의 출력 단자와 제2 튜너(210b)의 입력 단자가 각각 연결되어 있다. 따라서, 도 5의 (b)에 예시된 바와 같이 안테나를 통해 수신된 위성 신호가 제1 튜너(210α)의 입력 단자를 통해 입력되어 튜닝된 후 동일한 위성 신호가 제1 튜너(210α)의 출력 단자를 통해 제2 튜너(210b)의 입력 단자를 통해 입력되어 튜닝될 수 있다. 여기서, 동일한 위성 신호는 동일한 위성으로부터 입력된 편파 (polarization) 특성이 동일한 신호를 의미한다. 하나의 위성은 수직 편파
(vertically polarized wave) 특성을 갖는 위성 신호와 수평 편파(horizontally polarized wave) 특성을 갖는 위성 신호를 송신할 수 있다. 루프쓰루의 경우, 튜너 (210a, 210b)는 안테나로부터 연결되는 위성 신호선이 1개이므로, 편파 특성이 동일한 위성 신호에 의해 각각 트닝될 수 있다.

도 5의 (c)에 예시된 바와 같이, 각 튜너(210a, 210b)에 연결되는 위성 신호 선이 2개이며, 각 튜너(210a, 210b)에 연결된 위성 신호선은 하나의 안테나 또는 하나 이상의 안테나로부터 연결된 신호선이며, 각 튜너(210a, 210b)는 동일한 위성으로부터 위성 신호를 입력받을 수 있다. 이와 같은 연결 형태를 "듀얼 세이브(dual same)"라 정한다. 트닝 세이브의 경우, 각각의 LNB를 통해 각 튜너(210a, 210b)에 위성 신호선이 연결되므로 각 튜너(210a, 210b)는 동일한 위성으로부터 위성 신호를 입력받아 트닝할 수 있다. 이때, 각각의 튜너(210a, 210b)는 각각 편파 특성이 상이한 위성 신호를 각각 입력받아 각각 트닝할 수 있다. 즉, 제1 튜너(210a)는 수직 편파에 상응하는 제1 위성 신호를 입력받아 트닝될 수 있으며, 제2 튜너(210b)는 수평 편파에 상응하는 제2 위성 신호를 입력받아 트닝될 수 있다. 그러나, 도 5의 (c)에서 보여지는 바와 같이, 각각의 튜너에 연결된 위성 신호선이 하나의 안테나로부터 연결된 것이므로, 제1 튜너(210a)와 제2 튜너(210b)는 동일한 위성으로부터 각각 편파 특성이 다른 위성 신호를 입력받아 각각 트닝될 수 있다.

도 5의 (d)에 예시된 바와 같이, 각각의 튜너(210a, 210b)가 각각의 안테나를 통해 각각의 위성 신호선과 연결되는 경우의 연결 형태를 "듀얼 디퍼런트(dual different)"라 정한다. 즉, 트닝 디퍼런트의 경우, 제1 튜너(210a) 및 제2 튜너
(210b)의 입력 단자에 각각의 신호선이 연결되어 제1 튜너(210a) 및 제2 튜너(210b)는 독립적으로 튜닝이 가능하다. 튜얼 디퍼런트의 경우, 제1 튜너(210a) 및 제2 튜너(210b)에 연결된 위성 신호선이 각각 상이한 위성으로부터 연결되고, 제1 튜너(210a) 및 제2 튜너(210b)가 각각 상이한 위성 신호에 의해 독립적으로 튜닝되는 것이 튜얼 세임과는 차이가 있다.

도 6은 본 발명의 일 실시예에 따른 디지털 방송 수신기가 위성 신호선의 연결 상태를 확인하는 방법을 나타낸 순서도이며, 도 7은 본 발명의 일 실시예에 따른 N개의 안테나 설정에 대한 연결 상태 확인을 위한 상태 표이다. 이하에서는 제어부(240)가 위성 신호선의 연결 상태에 대해 별도의 소프트웨어 설정 없이 자동으로 튜너를 튜닝하여 연결 상태를 확인하는 방법에 대해 상세히 설명하기로 한다.

설명의 편의를 위해, 이하에서는 디지털 방송 수신기(200)에 2개의 튜너(210a, 210b)가 구비된 것을 가정하여 설명하기로 한다. 또한, 이하에서는 N(임의의 자연수) 개의 위성이 검색된 상태에서 N개의 위성간의 연결 상태를 설정하는 방법에 대해서 설명하기로 한다. 여기서, N개의 위성을 검색하는 방법은 당업자에게는 자명한 사항이므로 이에 대한 별도의 설명은 생략하기로 한다.

일반적으로 디지털 위성 방송 신호는 위성 중계기(TP: transponder)를 통해 중계되고, 위성 방송 안테나가 이를 수신하여 디지털 방송 수신기(200)에 전달한다. 이하, 설명과 이해의 편의를 위해 각각의 위성 방송 안테나에 수신되는 위성 방송 신호를 "TP 정보" 또는 "위성 신호"라 정하기로 한다. 여기서, TP 정보
또는 위성 정보는 TS(transport stream) 단위의 정보일 수 있다. 또한, 각각의 안테나로부터 연결된 위성 신호선이 각각의 튜너(210a, 210b)에 물리적으로 연결되어 있는 상태에서 각 안테나에 상응하는 각 위성간의 튜너(210a, 210b)의 연결 상태를 설정하는 방법에 대해서 설명하기로 한다.

이하의 설명은 N개의 안테나에 대해 각각의 안테나 설정에 대한 연결 상태를 설정하는 방법이나 이하의 편의를 위해 N개의 위성에 대한 연결 상태를 설정하는 것으로 설명하기로 한다.

반일, 도 7에 예시된 바와 같이, 복수의 안테나에 N개의 위성이 검색되었다면, 각각의 위성간의 연결 상태를 설정하기 위해서는 N\times N번의 연결 상태를 확인해야만 한다.

우선, 도 7에 대해 간략하게 설명하면, 이하, 도 7에서 A는 각 위성으로부터 입력된 위성 신호를 이용하여 두개의 튜너가 튜닝되는 요소들을 지칭하며, B와 C는 A요소에서 튜닝된 복수의 위성 신호를 이용하여 위성간의 튜너 연결 상태가 튜닝되는 요소들을 지칭한다. 여기서, B와 C는 각각 대청되므로 어느 하나의 요소에 대한 연결 상태만 설정하는 것을 가정하여 설명하기로 한다.

도 6을 참조하면, 단계 610에서 제어부(240)는 N개의 위성이 검색되었다면, 우선 동일한 안테나 정보를 갖는 각각의 위성에 대한 연결 상태를 설정한다. 예를 들어, 도 7을 참조하면, 대각선 요소에 있는 위성은 각각 동일한 안테나 설정을 갖는 위성임을 알 수 있다. 따라서, 각각의 위성(x, x는 임의의 자연수)로부터 송신된 위성 신호를 이용하여 제1 튜너(210a), 제2 튜너(210b)를 각각 튜닝함으로써

49-21
해당 위성(x)의 튜너 연결 상태를 확인할 수 있다.

예를 들어, 제1 위성 신호로 제1 튜너(210a)는 튜닝이 되었으나, 제2 튜너 (210b)는 튜닝되지 않았다고 가정하면, 제어부(240)는 위성(x)의 튜너 연결 상태를 제1 싱글 튜너로 설정할 수 있다. 이에 대해서는 하기에서 도 8을 참조하여 상세히 설명하기로 한다.

단계 620에서 제어부(240)는 동일한 안테나 정보를 갖는 각각의 위성(x)에 대해 설정된 연결 상태를 이용하여 서로 다른 안테나 정보를 갖는 위성간(예를 들어, 제1 위성(x), 제2 위성(y, y는 x보다 큰 자연수))의 연결 상태를 설정한다. 이에 대해서는 하기에서 도 9을 참조하여 상세히 설명하기로 한다.

예를 들어, 도 7을 참조하면 동일한 안테나 정보를 갖는 각각의 위성(x)에 대한 연결 상태가 모두 설정되어 있으므로, 각각 상이한 안테나 설정을 갖는 위성간(x, y)의 연결 상태는 미리 설정된 동일한 안테나 정보를 갖는 각각의 위성(x)의 연결 상태를 이용하여 설정될 수 있다.

도 7을 참조하면, 대각선 요소(710)를 기준으로 상위 영역(720)과 하위 영역 (730)이 중복되는 것을 알 수 있다. 따라서, 제어부(240)는 상위 영역(720) 또는 하위 영역(730) 중 어느 하나의 영역에 있는 위성간의 연결 상태만을 설정함으로써 전체 연결 상태를 설정할 수 있다.

도 8은 본 발명의 일 실시예에 따른 각각의 안테나 설정에 대한 상기 튜너의 연결 상태를 설정하는 방법을 나타낸 순서도이다. 이하에서는 도 7을 참조하면, 대
각선 요소(710)에 위치한 각각의 위성(x)에 대한 튜너 연결 상태를 설정하는 방법에 대해 설명하기로 한다. 즉, 이하에서는 도 7의 A요소에 대한 튜너 연결 상태를 설정하는 방법에 대해 설명하기로 한다.

이하의 설명은 N개의 안테나에 대해 각각의 안테나 설정에 대한 연결 상태를 설정하는 방법이나 이하의 편의를 위해 N개의 위성에 대한 연결 상태를 설정하는 것으로 설명하기로 한다.

도 8을 참조하면, 단계 810에서 제어부(240)는 동일한 위성 신호(이하에서는 TP 정보로 통칭하여 설명하기로 함)를 이용하여 제1 튜너(210a)와 제2 튜너(210b)를 각각 튜닝하여 모두 튜닝 가능하지 여부를 판별한다.

만일 동일한 TP 정보로 제1 튜너(210a)와 제2 튜너(210b)가 모두 튜닝되지 않았다면, 단계 815에서 제어부(240)는 위성(x)의 연결 상태를 제1 튜너(210a) 또는 제2 튜너(210b) 중 어느 하나만을 사용하는 싱글 튜너 형태임을 인식하여 싱글 튜너로 메모리(235)에 기록한다.

그러나, 만일 동일한 TP 정보로 제1 튜너(210a)와 제2 튜너(210b)가 모두 튜닝되었다면, 단계 820에서 제어부(240)는 제1 튜너(210a)와 제2 튜너(210b)로부터 입력된 위성 신호에서 PSI(program specification information) 또는 SI(service information) 정보를 각각 추출한다. 그리고, 제어부(240)는 각각 추출된 PSI 또는 SI 정보를 비교한다(단계 825).

예를 들어, 제1 튜너(210a)를 통해 입력된 TP 정보로부터 추출된 PSI 또는 SI 정보를 제1 PSI 또는 SI 정보라 칭하고, 제2 튜너(210b)를 통해 입력된 TP 정보
로부터 추출된 PSI 또는 SI 정보를 제2 PSI 또는 SI 정보라 정하기로 하자. 여기서, 만일 각각 추출된 PSI 또는 SI 정보가 동일하다고 결정되면, 제어부(240)는 위성(x)의 연결 상태가 적어도 두프쓰루 형태인 것을 인식할 수 있다. 그러나 만일 각각 추출된 PSI 또는 SI 정보가 상이하다고 결정되면, 제어부(240)는 제1 튜너(210a)와 제2 튜너(210b)에 튜닝된 TP 정보가 동일한 위성으로부터 송신된 것이 아님을 인식할 수 있다. 즉, 해당 TP 정보가 적어도 둘 이상의 위성에서 중복되어 있음을 인식할 수 있다. 여기서, PSI 또는 SI 정보는 디지털 위성 방송에 따른 DVB(digital video broadcasting) 규격에 포함된 정보이며, PSI 정보는 MPEG-2 규격에 포함된 정보이다. 이와 같은 PSI 또는 SI 정보를 입력받아 추출하는 방법은 당업자에게는 자명한 사항이므로 이에 대한 별도의 설명은 생략하기로 한다.

만일 각각의 PSI 또는 SI 정보가 동일하지 않다고 결정되면, 제어부(240)는 단계 815로 진행하여 해당 위성(x)의 연결 상태를 싱글 튜너로 메모리(235)에 기록한다.

그러나 만일 각각의 PSI 또는 SI 정보가 동일하다고 결정되면, 단계 830에서 제어부(240)는 제1 튜너(210a) 또는 제2 튜너(210b) 중 어느 하나를 편과 특성이 다른 TP 정보로 튜닝을 시도하여 제1 튜너(210a)와 제2 튜너(210b)가 모두 튜닝되어 있는지 여부를 판단한다.

예를 들어. 단계 810에서 제1 튜너(210a)와 제2 튜너(210b)가 수작 앞으로 특성을 갖는 TP 정보(이하, "제1 TP 정보"라 정하기로 함)를 이용하여 각각 튜닝되었다고 가정하자. 이와 같은 상태에서 제어부(240)는 제1 튜너(210a)를 수평 편과 특
성을 갖는 TP 정보(이하, "제2 TP 정보"라 정하기로 함)를 이용하여 튜닝한 후 제1 튜너(210a)와 제2 튜너(210b)가 모두 튜닝되었는지 여부를 판단한다.

만일 제1 튜너(210a)만 튜닝되고 제2 튜너(210b)에는 TP 정보가 입력되지 않는다면, 단계 835에서 제어부(240)는 해당 위성(x)의 연결 상태가 적어도 루프스루인 것으로 인식하여 연결 상태를 루프스루로 설정한다.

그러나 만일 제1 튜너(210a)와 제2 튜너(210b)가 모두 튜닝되었다면(즉, 편과 특성이 상이한 TP 정보에 의해 각각 튜닝되었다면), 단계 840에서 제어부(240)는 해당 위성(x)의 연결 상태가 적어도 두열 세임인 것으로 인식하여 연결 상태를 두열 세임으로 설정한다.

제어부(240)는 단계 810 내지 단계 840을 반복 수행하여 N개의 위성에 대해 각각의 위성의 튜너 연결 상태를 설정할 수 있다.

도 9는 본 발명의 일 실시예에 따른 각 위성간의 연결 상태를 설정하는 방법을 나타낸 순서도이다. 이하에서는 도 8을 우선 수행하여 N개의 위성에 대한 대각선 요소에 위치한 각각의 위성에 대한 연결 상태가 모두 확인되어 있는 것을 가정하며, 해당 위성에 대한 연결 상태를 이용하여 도 7의 상위 영역(720)에 속한 위성간의 연결 상태를 확인하는 방법에 대해 설명하기로 한다. 즉, 이하에서는 도 7의 B와 C가 대칭되므로 어느 하나에 대한 위성간의 연결 상태를 설정하는 방법에 대해 설명하기로 한다.

이하의 설명은 N개의 안테나에 대해 각각의 안테나 설정에 대한 연결 상태를
설정하는 방법이나 이해의 편의를 위해 N개의 위성에 대한 연결 상태를 설정하는 것으로 설명하기로 한다.

우선, 도 9에는 도시되어 있지 않으나, 제어부(240)는 동일한 안테나 정보를 갖는 각각의 위성의 연결 상태에 의해 논리적으로 자명하게 도출되는 위성간의 연결 상태를 우선 설정한다.

예를 들어, 제1 위성의 연결 상태가 제1 싱글 튜너이고, 제2 위성의 연결 상태가 제1 싱글 튜너이면, 제어부(240)는 제1 위성과 제2 위성의 연결 상태를 제1 싱글 튜너로 설정한다. 반면 제1 위성과 제2 위성이 연결 상태가 각각 제2 싱글 튜너이면, 제어부(240)는 제1 위성과 제2 위성의 연결 상태를 제2 싱글 튜너로 설정할 수 있다.

또한, 제1 위성의 연결 상태가 제1 싱글 튜너 및 제2 싱글 튜너 중 어느 하나이고, 제2 위성의 연결 상태가 제1 및 제2 싱글 튜너 중 다른 하나이면, 제1 위성과 제2 위성은 물리적으로 각각 상이한 위성 신호를 독립적으로 튜닝할 수 있으므로 제어부(240)는 제1 위성 및 제2 위성의 연결 상태를 듀얼 디퍼런트로 설정한다.

또한, 제1 위성의 연결 상태가 제1 싱글 튜너 또는 제2 싱글 튜너 중 어느 하나이고, 제2 위성의 연결 상태가 듀얼 세임이며, 제어부(240)는 제1 위성과 제2 위성이 제1 및 제2 튜너로 각각 독립적으로 튜닝이 가능하므로 제1 위성과 제2 위성의 연결 상태를 듀얼 디퍼런트로 설정할 수 있다.

물론, 제1 위성의 연결 상태가 듀얼 세임이고, 제2 위성의 연결 상태가 제1
또한, 제1 위성의 연결 상태가 두플라우이고, 제2 위성의 연결 상태가 두플라우이면, 제어부(240)는 제1 위성과 제2 위성이 제1 또는 제2 튜너로 각각 독립적으로 튜닝이 가능하므로 제1 위성과 제2 위성의 연결 상태를 두플라우 디퍼런트로 설정할 수 있다.

또한, 제1 위성과 제2 위성의 연결 상태가 각각 두플라우이면, 제어부(240)는 제1 위성과 제2 위성이 제1 또는 제2 튜너로 각각 독립적으로 튜닝될 수 있으므로 두플라우로 설정할 수 있다.

또한, 제1 위성의 연결 상태가 제1 또는 제2 상글 튜너 중 어느 하나이고, 제2 위성의 연결 상태가 루프쓰루이면, 제어부(240)는 제1 위성과 제2 위성이 제1 또는 제2 튜너로 각각 독립적으로 튜닝 가능하므로 제1 위성과 제2 위성의 연결 상태를 두플라우 디퍼런트로 설정할 수 있다.

또한, 제1 위성의 연결 상태가 루프쓰루이고, 제2 위성의 연결 상태가 루프쓰루인 경우에는 제1 위성과 제2 위성은 각각의 입력 신호에 의해 동시에 독립적으로 튜닝이 가능한 경우와 동시에 독립적으로 튜닝이 가능하지 않은 경우 중 어느 하나일
수 있다. 따라서 이와 같은 경우에 하기의 방법을 수행하여 해당 위성간의 연결 상태를 확인 설정해야 한다. 이하에서 도 9를 참조하여 보다 상세히 설명하기로 한다.

도 9를 참조하면, 단계 910에서 체어부(240)는 제1 튜너(210a)와 제2 튜너(210b)를 동일한 TP 정보("제3 TP 정보"라 정함)을 이용하여 튜닝을 시도한다. 예를 들어, 체어부(240)는 제1 튜너(210a)를 제3 TP 정보를 이용하여 튜닝한 후 제2 튜너(210b)를 제3 TP 정보를 이용하여 튜닝한다.

단계 915에서 체어부(240)는 제1 튜너(210a)를 통해 입력된 제3 TP 정보에서 PSI 또는 SI 정보를 획득한다. 여기서, PSI 또는 SI 정보를 획득하는 방법은 당업자에게는 자명한 사항이므로 이에 대한 별도의 설명은 생략하기로 한다. 이하, 편의상 제3 TP 정보로 튜닝된 제1 튜너(210a)를 통해 입력된 위성 신호에서 획득한 PSI 또는 SI 정보를 제3 PSI 또는 SI 정보라 정하기로 한다.

단계 920에서 체어부(240)는 제1 튜너(210a)를 다른 위성으로부터 제3 TP 정보와는 상이한 TP 정보(편의상 "제4 TP 정보"라 정하기로 함)로 튜닝한다.

이와 같은 상태에서 제2 튜너(210b)에 튜닝된 제3 TP 정보가 끝여지면 두 위성간의 연결 상태는 적어도 루프쓰루임을 알 수 있다. 단일 제2 튜너(210b)에 튜닝된 제3 TP 정보가 입력되지 않는다면, 튜너(210a, 210b)의 물리적 연결 형태가 상을 튜너이거나 또는 루프쓰루임을 알 수 있다.

단계 925에서 체어부(240)는 제3 TP 정보로 튜닝된 제2 튜너(210b)를 통해 입력된 위성 신호에서 PSI 또는 SI 정보(이하 편의상 "제4 PSI 또는 SI 정보"라 정
하기로 함)을 추출한다.

단계 930에서 제어부(240)는 제3 PSI 또는 SI 정보와 제4 PSI 또는 SI 정보가 동일한지 여부를 판단한다.

만일 제3 및 제4 PSI 또는 SI 정보가 동일하다고 결정되면, 단계 935에서 제어부(240)는 두 위치간의 연결 상태를 둔실 디피런트 상태인 것으로 메모리(235)에 기록한다.

즉, 제3 및 제4 PSI 또는 SI 정보가 동일하다는 것은 제2 튜너(210b)가 끊어지지 않은 것을 의미하며, 두 위치간은 동시에 독립적으로 튜닝이 가능하다는 것을 의미한다.

그러나 만일 제3 및 제4 PSI 또는 SI 정보가 동일하지 않다고 결정되면, 단계 940에서 제어부(240)는 두 위치간의 연결 상태를 싱글 튜너 상태인 것으로 메모리(235)에 기록한다. 여기서, 물론 두 위치간의 연결 상태를 루프스토일 수도 있다. 그러나, 두 위치는 동시에 각각 독립적으로 튜닝이 가능하지 않으므로 편의상 싱글 튜너로 설정할 수 있다.

제어부(240)는 단계 910 내지 단계 940을 반복 수행하여 모든 위치간의 연결 상태를 확인 설정한다.

【발명의 효과】

상술한 바와 같이, 본 발명에 따른 위치선호선의 연결 상태 설정 방법 및 장치를 제공함으로써, 2개의 튜너를 갖는 디지털 방송 수신기에서 각 튜너의 위치선호선

49-29
호선의 연결 상태를 자동으로 설정하도록 할 수 있는 효과가 있다.

또한, 본 발명은 설정이 복잡한 각 튜너의 위성신호선의 연결 상태를 자동으로 설정하도록 함으로써 사용자의 편의를 증진시킬 수 있는 효과도 있다.

또한, 본 발명은 다이렉트(Digital satellite equipment control) 스위치를 사용하는 경우 서로 다른 위성에 동일한 TP 정보를 갖음으로 인해 반복하게 발생되는 튜너 설정의 오류 가능성을 줄일 수 있는 효과도 있다.

또한, 본 발명은 위성간의 튜너의 연결 상태를 싱글 타입, 루프쓰루(loop through) 타입, 듀얼 세임(dual same) 타입, 듀얼 디퍼런트(dual different) 타입 중 어느 하나로 설정할 수 있는 효과도 있다.

또한, 본 발명은 위성간의 튜너 연결 상태를 설정함으로써 녹화 또는 시청 예약된 채널들에 새로운 채널을 추가할 때 튜너의 연결 상태를 미리 파악할 수 있어 예약 목록에 추가 가능함지 여부를 미리 인식할 수 있도록 함으로써 사용자의 편의성을 증진시킬 수 있는 효과도 있다.

상기에서는 본 발명의 바람직한 실시예를 참조하여 설명하였지만, 해당 기술 분야에서 통상의 지식을 가진 자라도 하기의 특허 청구의 범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는 범위 내에서 본 발명을 다양하게 수정 및 변 경시킬 수 있음을 이해할 수 있을 것이다.
【특허청구범위】

【청구항 1】

복수의 튜너를 구비한 디지털 방송 수신기에서 하나 이상의 안테나에 연결된
n(임의의 자연수)개의 위성에 대한 튜너 연결 상태를 설정하는 방법에 있어서,

각 위성으로부터 입력된 위성 신호를 이용하여 각각의 위성에 대한 상기 튜너
의 연결 상태를 설정하는 단계; 및

각각의 위성에 대해 설정된 연결 상태와 각 위성들로부터 입력된 위성 신호
를 이용하여 각 위성간의 상기 튜너의 연결 상태를 설정하는 단계를 포함하는 연결
상태 설정 방법.

【청구항 2】

제 1항에 있어서,

상기 각 위성은 하나의 안테나 정보를 갖으며,

상기 안테나 정보는 LNB(Low Noise Block down converter) 정보, 22Khz Tone
정보, 위성 정보 및 디에제(Diseqc) 스위치 입력 정보 중 하나 이상의 조합을 포함
하는 것을 특징으로 하는 연결 상태 설정 방법.

【청구항 3】

제 1항에 있어서.
각각의 위성에 대한 상기 튜너의 연결 상태를 설정하는 단계는,

임의의 하나의 위성에서 수신된 제1 위성 신호로 제1 튜너와 제2 튜너를 각각 튜닝하여 제1 및 제2 튜너가 각각 튜닝되었는지 여부를 판단하는 단계:

상기 제1 및 제2 튜너가 각각 튜닝된 경우, 상기 제1 및 제2 튜너를 통해 입력된 상기 제1 위성 신호로부터 각각 PSI 또는 SI 정보를 추출하여 동일한지 여부를 판단하는 단계.

상기 각 PSI 또는 SI 정보가 동일하다고 결정되면, 상기 제1 및 제2 튜너 중 어느 하나의 튜너로 상기 제1 위성 신호와 뿐만 아니라 다른 제2 위성 신호로 튜닝하는 단계: 및

상기 제1 위성 신호와 상기 제2 위성 신호에 의해 상기 제1 및 제2 튜너가 각각 튜닝된 경우, 상기 위성의 연결 상태를 동일 제일(dual same)으로 설정하는 단계를 포함하는 연결 상태 설정 방법.

【참고한 4】

제 3항에 있어서,

상기 제1 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나가 튜닝되지 않은 경우, 상기 위성의 연결 상태를 싱글 튜너(single tuner)로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.
【정구항 5】

제 3항에 있어서,

상기 제1 위성 신호로부터 획득된 각 PSI 또는 SI 정보가 동일하지 않은 경우, 상기 위성의 연결 상태를 싱글 튜너로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【정구항 6】

제 3항에 있어서,

상기 제2 위성 신호에 의해 상기 제1 및 제2 튜너 중 어느 하나의 튜너가 튜닝된 후 다른 하나의 튜너가 연결이 끊어지면, 상기 위성의 연결 상태를 루프스ルー (loop through)로 설정하는 단계를 더 포함하는 것을 특정으로 하는 연결 상태 설정 방법.

【정구항 7】

제 1항에 있어서,

각각의 위성에 대해 설정된 연결 상태를 이용하여 각 위성간의 상기 튜너의 연결 상태를 설정하는 단계는,

제1 튜너와 제2 튜너를 제3 위성 신호로 각각 튜닝하는 단계:

상기 제1 튜너를 통해 입력된 상기 제3 위성 신호에서 제1 PSI 또는 SI 정보
를 추출하는 단계:

상기 제1 튜너를 상기 제3 위성 신호와는 다른 위성의 신호인 제4 위성 신호로 튜닝하는 단계:

상기 제2 튜너를 통해 입력된 상기 제3 위성 신호에서 제2 PSI 또는 SI 정보를 추출하는 단계:

상기 추출된 제1 및 제2 PSI 또는 SI 정보가 동일하지 여부를 판단하는 단계: 및

만일 동일하다고 결정되면, 각 위성간의 연결 상태를 듀얼 디퍼런트(dual different)로 설정하는 단계를 포함하는 연결 상태 설정 방법.

【청구항 8】

제 7항에 있어서,

만일 상기 제1 및 제2 PSI 또는 SI 정보가 동일하지 않다고 판단되면, 각 위성간의 연결 상태를 싱글 튜너로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【청구항 9】

제 7항에 있어서,

제1 위성의 연결 상태가 제1 싱글 튜너이고, 제2 위성의 연결 상태가 제1 싱
글 드러내면, 상기 제1 위성과 제2 위성간의 연결 상태는 제1 싱글 드러너로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【정구항 10】

제 7항에 있어서,

제1 위성의 연결 상태가 루프쓰루이고, 제2 위성의 연결 상태가 듀얼 세임이면, 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 디퍼런트로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【정구항 11】

제 7항에 있어서,

제1 위성의 연결 상태가 듀얼 세임이고 제2 위성의 연결 상태가 듀얼 세임이면, 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 세임으로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【정구항 12】

제 7항에 있어서,

제1 위성의 연결 상태가 제1 및 제2 싱글 드러너 중 어느 하나이고 제2 위성의 연결 상태가 듀얼 세임이면 상기 제1 위성과 제2 위성간의 연결 상태를 듀얼 디퍼

49-35
런트로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【청구항 13】

제 7항에 있어서,

제1 위성의 연결 상태가 제1 성급 튜너이고, 제2 위성의 연결 상태가 제2 성급 튜너이면, 상기 제1 위성과 상기 제2 위성간의 연결 상태를 듀얼 디퍼런트로 설정하는 단계를 더 포함하는 연결 상태 설정 방법.

【청구항 14】

각 안테나로부터 입의의 위성에서 송신된 위성 신호를 입력받는 복수의 튜너:

상기 위성 신호를 복조하는 디모듈레이터:

상기 복조된 위성 신호를 데이터 유형에 따라 분류하여 출력하는 디믹스;

상기 디믹스에 의해 분리된 각각의 데이터를 복호하는 디코더; 및

상기 튜너를 통해 입력된 상기 위성 신호를 이용하여 n(입의의 자연수)개의 위성에 상응하는 튜너 연결 상태를 설정하는 제어부를 포함하되,

상기 제어부는 각각의 위성에 대한 튜너의 연결 상태를 설정한 후 각 위성에 대해 설정된 연결 상태를 이용하여 각 위성간의 튜너 연결 상태를 설정하는 것을 특징으로 하는 디지털 방송 수신기.
【정구항 15】

제 14항에 있어서,

상기 각 위성간 설정된 튜너 연결 상태를 저장하는 메모리를 더 포함하는 디지털 방송 수신기.

【정구항 16】

제 14항에 있어서,

상기 제어부는 임의의 위성을 통해 수신된 제5 위성 신호를 이용하여 제1 튜너와 제2 튜너를 각각 튜닝하여 제1 및 제2 튜너 중 어느 하나가 튜닝되지 않으면 상기 위성의 튜너 연결 상태를 상급 튜너로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【정구항 17】

제 14항에 있어서,

상기 제어부는 제5 위성 신호로 상기 제1 및 제2 튜너가 각각 튜닝되면, 상기 제1 및 제2 튜너로부터 각각 PSI 또는 SI 정보를 추출하여 동일한지 여부를 판단한 후 동일하다고 결정되면, 상기 제5 위성 신호와는 다른 위성의 신호인 제6 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나를 튜닝한 후 상기 제5 및 제6 위성

49-37
신호에 의해 상기 제1 및 제2 튜너가 각각 투닝된 경우 상기 위성의 튜너 연결 상태를 둘어 세입으로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 18】

제 17항에 있어서,

상기 제6 위성 신호로 상기 제1 및 제2 튜너 중 어느 하나를 투닝한 후 상기 제1 및 제2 튜너 중 어느 하나가 투닝되지 않은 경우 상기 위성의 튜너 연결 상태를 둘어 쓰르로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 19】

제 17항에 있어서,

상기 제1 및 제2 튜너로부터 각각 PIS 또는 SI 정보를 획득하여 동일한지 여부를 판단한 후 동일하지 않다고 결정되면 상기 위성의 튜너 연결 상태를 싱글 튜너로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 20】

제 14항에 있어서,

상기 예외나는 제3 및 제4 위성의 연결 상태가 각각 제1 싱글 튜너이며, 상기 제3 및 제4 위성간의 튜너 연결 상태를 제1 싱글 튜너로 설정하며,
상기 제3 및 제4 위성의 연결 상태가 각각 제2 상글 튜너이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 제2 상글 튜너로 설정하는 것을 특정으로 하는 디지털 방송 수신기.

【청구항 21】

제 14항에 있어서,

상기 제어부는 제3 위성의 연결 상태가 제1 및 제2 상글 튜너 중 어느 하나이고, 제4 위성의 연결 상태가 제1 및 제2 상글 튜너 중 다른 하나이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정하는 것을 특정으로 하는 디지털 방송 수신기.

【청구항 22】

제 14항에 있어서,

상기 제어부는 제3 위성의 연결 상태가 제1 상글 튜너, 제2 상글 튜너 및 루프스루 중 어느 하나이고, 제4 위성의 연결 상태가 듀얼 세임이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정하는 것을 특정으로 하는 디지털 방송 수신기.
【청구항 23】

제 14항에 있어서,

상기 제어부는 제3 위성의 연결 상태가 듀얼 세일이고 제4 위성의 연결 상태가 듀얼 셀이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 24】

제 14항에 있어서,

상기 제어부는 제3 위성의 연결 상태가 제1 및 제2 싱글 튜너 중 어느 하나이고, 제4 위성의 연결 상태가 루프쓰러이면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정하는 것을 특징으로 하는 디지털 방송 수신기.

【청구항 25】

제 14항에 있어서.

상기 제어부는 제3 위성 및 제4 위성의 연결 상태가 각각 루프쓰러이면, 제1 튜너 및 제2 튜너가 상기 제3 위성 및 제4 위성에 의해 동시에 독립적으로 튜닝이 가능한지 여부를 판단하여 동시에 독립적 튜닝이 가능하면, 상기 제3 및 제4 위성간의 튜너 연결 상태를 듀얼 디퍼런트로 설정하는 것을 특징으로 하는 디지털 방송 수신기.
【청구항 26】

제 25항에 있어서.

상기 제어부는 상기 제1 튜너와 상기 제2 튜너가 상기 제3 위성 및 제4 위성에 의해 동시에 독립적으로 튜닝이 가능하지 않으면 상기 제3 위성 및 제4 위성간의 튜너 연결 상태를 싱글 튜너로 설정하는 것을 특징으로 하는 디지털 방송 수신기.
도면

도 1

11 12 13

20

40

30

49-42
【도 3】
위성1  .........  위성M

스위치  ~  310
신호선

【도 4】
위성1  .........  위성L  위성1  .........  위성M

스위치  ~  310
신호선1

스위치  ~  310
신호선2
각각의 위성에 대한 튜너의 연결 상태 설정

각각의 위성에 대해 설정된 연결 상태를 이용하여 각 위성들간의 튜너의 연결 상태 설정

종료
| 1 | 2 | 3 | 4 | \cdots | N |
|---|---|---|---|---------|
| 1 | A | B | B | B | B |
| 2 | C | A | B | B | B |
| 3 | C | C | A | B | B |
| 4 | C | C | C | A | B |
| \vdots | \vdots | \vdots | \vdots | \vdots | \vdots |
| N | C | C | C | C | A |

720

710

730
시작

같은 TP 정보로 제1 튜너와 제2 튜너가 모두 튜닝? 

예 820

제1 튜너와 제2 튜너로부터 입력된 TP 정보에서 SI 정보를 각각 추출

아니오

상용 형과 형태로 기록

각각 추출된 SI 정보 동일? 

예 825

각각 추출된 SI 정보 동일? 

아니오

복사 형과 형태로 기록

뒤따 특성이 다른 TP 정보로 제1 튜너 튜닝 성공?

예 830

뒤따 형과 형태로 기록

아니오

殆열 세임 형태로 기록

종료
시 작

제1 튜너와 제2 튜너를 동일한 TP 정보로 튜닝 910

제1 튜너를 통해 입력된 TP 정보에서 SI 정보 추출 915

제1 튜너를 다른 위성의 TP 정보로 튜닝 920

제2 튜너를 통해 입력된 TP 정보에서 SI 정보 추출 925

각각 추출된 SI 정보 동일? 930

아니오 940

예

듀얼 디파런트로 기록 935

종 료

싱글 튜너로 기록
# DO/EO WORKSHEET

Patent Application Specialist/ National Stage Division:

U.S. Appl. No. 12094376

International Appl. No. PCT/KR2004/005031

Application filed by: □ 20 months □ 30 months

WIPO PUBLICATION INFORMATION:

Publication No.: WO2007/064125
Publication Language: □ English □ German □ Japanese □ Chinese □ Korean
□ French □ Spanish □ Russian □ Other

Publication Date: 07/07/2007
Not Published: □ US only designated □ EP request
Published: □ EP request

INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE:

☑ International Application (RECORD COPY)

☐ Article 19 Amendments


☐ Annexes to 409


☐ Other:

☑ Search Report References

☐ Priority Document(s) No. 2

☐ N/A

☐ Priority Document was NOT AVAILABLE at the time of paralegal review

RECEIPTS FROM THE APPLICANT (other than checked above):

☑ Preliminary Amendment(s) Filed on:

☐ Same as 371 request date: 2 □ 3

☐ Information Disclosure Statement(s) Filed on:

☐ Same as 371 request date: 2 □ 3

☐ Assignment Document (forwarded to Assignee Branch)

☐ Assignee Statement Under 37 CFR 3.73(b)

☐ Assignee PG Publication Notice

☐ Substitute Specification Filed on:

☐ Same as 371 request date: 2 □ 3

☐ Verified Small Status Statement

☐ Oath/Declaration (executed)

☐ Oath/Declaration □ unsigned □ no citizenship □ other

☐ DNA Diskette □ Sequence Listing

☐ Other:

NOTES: ☐ I.A. used as Specification ☐ Other:

35 U.S.C. 371 - Receipt of Request (PTO-1390) mo. / day / yr. 200

Date Acceptable Oath/Declaration Received: □ Same as 371 Req. Date; 2 □ mo. / day / yr. 200

Date of Completion of requirements under 35 U.S.C. 371: □ Same as 371 Req. Date; □ Same as OATH Date; 2 □ mo. / day / yr. 200

Date of Completion of DO/EO 903 - Notification of Acceptance

Date of Completion of DO/EO 905 - Notification of Missing Requirements

Date of Completion of DO/EO 909 - Notification of Amendment

Date of Completion of DO/EO 916 - Notification of Defective Response

Date of Completion of DO/EO 921 - Notification to Comply w/ Requirements for Patent Applications Containing Nucleotide and/or Amino Acid Sequence Disclosures

Date of Completion of DO/EO 923
## PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 8, 2004

### CLAIMS AS FILED - PART I

<table>
<thead>
<tr>
<th>U.S. NATIONAL STAG FEES</th>
<th>(Column 1)</th>
<th>(Column 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC FEE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXAMINATION FEE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEARCH FEE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEE FOR EXTRA SPEC. PGS.</td>
<td>minus 100 =</td>
<td>150 =</td>
</tr>
<tr>
<td>TOTAL CHARGEABLE CLAIMS</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>INDEPENDENT CLAIMS</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>MULTIPLE DEPENDENT CLAIM PRESENT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

### CLAIMS AS AMENDED - PART II

<table>
<thead>
<tr>
<th>AMENDMENT A</th>
<th>(Column 1)</th>
<th>(Column 2)</th>
<th>(Column 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAIMS REMAINING AFTER AMENDMENT</td>
<td>*</td>
<td>Minus</td>
<td>**</td>
</tr>
<tr>
<td>HIGHEST NUMBER PREVIOUSLY PAID FOR</td>
<td>*</td>
<td>Minus</td>
<td>***</td>
</tr>
<tr>
<td>PRESENT EXTRA</td>
<td>*</td>
<td>Minus</td>
<td>***</td>
</tr>
</tbody>
</table>

FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM

### SMALL ENTITY TYPE

<table>
<thead>
<tr>
<th>RATE</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC FEE</td>
<td>310</td>
</tr>
<tr>
<td>EXAM. FEE</td>
<td>210</td>
</tr>
<tr>
<td>SEARCH FEE</td>
<td>410</td>
</tr>
<tr>
<td>X $ 125 =</td>
<td>301</td>
</tr>
<tr>
<td>X $ 50 =</td>
<td>360</td>
</tr>
<tr>
<td>+ $ 180 =</td>
<td>1230</td>
</tr>
</tbody>
</table>

**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 "50".**

**If the "Highest Number Previously Paid For" IN THIS SPACE is less than "3", enter "0".**

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.
<table>
<thead>
<tr>
<th>CLAIMS</th>
<th>AS FILED</th>
<th>AFTER 1ST AMENDMENT</th>
<th>AFTER 2ND AMENDMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IND.</td>
<td>DEP.</td>
<td>IND.</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>55</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>57</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>58</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>59</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>61</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>63</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td>64</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td>67</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td>68</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td>74</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td>77</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td>78</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td>79</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td>82</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td></td>
<td>83</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td></td>
<td>84</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td></td>
<td>85</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>37</td>
<td></td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>38</td>
<td></td>
<td></td>
<td>88</td>
</tr>
<tr>
<td>39</td>
<td></td>
<td></td>
<td>89</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>41</td>
<td></td>
<td></td>
<td>91</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>43</td>
<td></td>
<td></td>
<td>93</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td>94</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td>95</td>
</tr>
<tr>
<td>46</td>
<td></td>
<td></td>
<td>96</td>
</tr>
<tr>
<td>47</td>
<td></td>
<td></td>
<td>97</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td></td>
<td>98</td>
</tr>
<tr>
<td>49</td>
<td></td>
<td></td>
<td>99</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

| TOTAL IND. | 2 |
| TOTAL DEP. | 24 |
| TOTAL CLAIMS | 24 |
**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number: 12/094,376

Filing Date: 05/20/2008

□ To be Mailed

### APPLICATION AS FILED – PART I

<table>
<thead>
<tr>
<th></th>
<th>SMALL ENTITY □</th>
<th>OR</th>
<th>OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Fee (37 CFR 1.16(a), (b), or (c))</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Search Fee (37 CFR 1.16(c), (d), or (m))</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Examination Fee (37 CFR 1.16(b), (g), or (h))</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Total Claims (37 CFR 1.16(j))</td>
<td>minus 20 = *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Claims (37 CFR 1.16(h))</td>
<td>minus 3 = *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Size Fee (37 CFR 1.16(e))</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(e).

### APPLICATION AS AMENDED – PART II

05/20/2008

<table>
<thead>
<tr>
<th>AMENDMENT</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAIMS REMAINING AFTER AMENDMENT</td>
<td>HIGHEST NUMBER PREVIOUSLY PAID FOR</td>
</tr>
<tr>
<td>Total (37 CFR 1.16(j))</td>
<td>26</td>
</tr>
<tr>
<td>Independent (37 CFR 1.16(b))</td>
<td>2</td>
</tr>
<tr>
<td>Application Size Fee (37 CFR 1.16(e))</td>
<td></td>
</tr>
</tbody>
</table>

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

### AMENDMENT

<table>
<thead>
<tr>
<th>AMENDMENT</th>
<th>SMALL ENTITY OR OTHER THAN SMALL ENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAIMS REMAINING AFTER AMENDMENT</td>
<td>HIGHEST NUMBER PREVIOUSLY PAID FOR</td>
</tr>
<tr>
<td>Total (37 CFR 1.16(j))</td>
<td>Minus **</td>
</tr>
<tr>
<td>Independent (37 CFR 1.16(b))</td>
<td>Minus ***</td>
</tr>
<tr>
<td>Application Size Fee (37 CFR 1.16(e))</td>
<td></td>
</tr>
</tbody>
</table>

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

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

** 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: EVANGELINE HARRIS

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 1-866-PTO-9199 and select option 2.