



(51) International Patent Classification:

H04N 5/50 (2006.01) H04N 5/44 (2011.01)
H04N 21/426 (2011.01)

(21) International Application Number:

PCT/EP2014/079044

(22) International Filing Date:

22 December 2014 (22.12.2014)

(25) Filing Language:

English

(26) Publication Language:

English

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

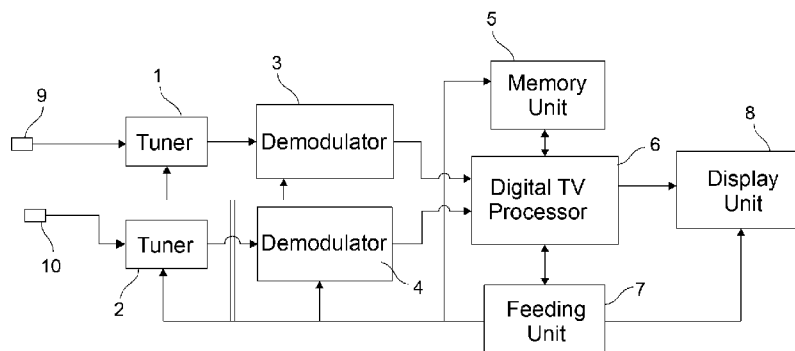
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: SYSTEM FOR SIMULTANEOUS SCANNING OF SEPARATE ACCESS CONTENTS IN AN IMAGE DISPLAY
DEVICE

Fig. 1



(57) Abstract: The present invention relates to a signal processing device having channel list update function, the update function, when called, effecting updating of the channel list in a substantially reduced amount of time. More particularly, the present invention relates to a signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor (6), a first tuner (1) and a second tuner (2), the first tuner (1) and second tuner (2) being respectively in association with a first and second de-modulator (3, 4) which supply transport streams, the signal processing device further communicating a display unit (8).

Description**SYSTEM FOR SIMULTANEOUS SCANNING OF SEPARATE ACCESS
CONTENTS IN AN IMAGE DISPLAY DEVICE**

- [0001] The present invention relates to a signal processing device having channel list update function, the update function, when called, effecting updating of the channel list in a substantially reduced amount of time.
- [0002] Digital and interactive TV systems provide a comprehensive amount of TV channels and programs leading to the general outcome that conventional methods for configuring the operation of the image display device from among a plurality of setting parameters may become inefficient to the extent that it is unperformable in a time-saving manner.
- [0003] Considering the fact that a large number of television and multimedia services are being made available to consumers today, methods for enabling the host, i.e. an image display device such as a TV set with a digital receiver-decoder to satisfactorily process the received services are required. An image display device may receive programs via cable or satellite broadcasting in the form of separate subscription formats.
- [0004] A transponder typically receives a television signal on the ground from satellite uplink stations and processes the signal by encoding, amplifying and rebroadcasting the same. Satellite receivers then transmit the same to a digital receiver of an end-user so that it is decoded and displayed on an image display device.
- [0005] Assuming that a TV service may have hundreds of channels, configuring channel information for a significant number of channels on a manual basis might take some serious time. It is to be noted that an image display device can be factory-configured such that channel information is preloaded for a plurality of channels, in which case, the image display device will be ready for the first use.
- [0006] Alternatively, users can initiate auto-scan function to automatically retrieve channel-specific information, generally based on a preloaded frequency range or transponder information.
- [0007] If the auto-scan function is performed such that both the preloaded frequency ranges are scanned, transponder list is checked and an

additional blind scan is performed, without inputting any parameters by the user, a substantially longer amount of time is needed for completing this network scan.

- [0008] Accordingly, configuration of channel information can be better managed and users can be offered a less troublesome viewing experience without having to manually delete and/or update information on a continual basis or wait for a substantial amount of time for completion of the network scan task. The present invention therefore substantially accelerates maintenance of the channel information.
- [0009] Among others, one of the prior art disclosures in the technical field of the present invention can be referred to as US6055431, which defines a method for controlling the operation of multiple beam antenna systems in communication with satellite transponders. The method controls the coverage area assignments, frequency assignments, transmitted power level assignments, and component allocation assignments of these multiple beam antenna transponders in response to the existing and time varying demands for satellite resources. The method manages the operation of the satellite transponders to optimize the overall capacity of the communication satellite.
- [0010] The present invention provides a system and method by which a signal processing device is operable so as to automatically manage configuration of channel settings in a substantially accelerated and non-intrusive manner without requiring additional actions on the part of the user, as provided by the characterizing features defined in Claim 1.
- [0011] Primary object of the present invention is to provide a system and method by which management of channel information in an image display device is carried out automatically in a substantially reduced amount of time by which inaccurate or outdated settings are also clearable.
- [0012] The present invention proposes a signal processing device in the form of a receiver or image display device. The signal processing device receives a plurality of broadcasting services while a first terrestrial/cable tuner and a second satellite tuner supply transport streams to a digital TV processor.
- [0013] The digital TV processor performs a channel information retrieving

operation having simultaneously initiated first and second stages. The first stage entails scanning of frequency bands allocated to terrestrial or cable broadcasting services by means of the first tuner. A second stage of the channel information retrieving operation continues while frequencies of retrieved broadcasting channels are recorded and the user is able to view these channels. The digital TV processor performs the second stage by means of the second tuner updating transponders in association with a satellite. Therefore, the second tuner is a satellite tuner.

[0014] Accompanying drawings are given solely for the purpose of exemplifying a system and method by which an image display device is operable, whose advantages over prior art were outlined above and will be explained in brief hereinafter.

[0015] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.

[0016] Fig. 1 demonstrates a general schematic view of the main components of the signal processing device according to the present invention.

[0017] Fig. 2 demonstrates a general flow diagram according to which the signal processing device of the invention executes the method according to the present invention.

[0018] The following numerals are being referred to in the detailed description of the present invention.

1. First tuner
2. Second tuner
3. First demodulator
4. Second demodulator
5. Memory unit
6. Digital TV processor
7. Feeding unit
8. Display unit
9. Terrestrial antenna
10. Satellite dish

- [0019] The present invention proposes a signal processing device in the form of an image display device or a set-top box receiving programs via cable, terrestrial antenna (9) or satellite broadcasting in the form of separate subscription formats. A set-top box typically contains at least one tuner input, operating in connection with an image display device. Alternatively, the image display device itself can receive programs using cable, satellite or over-the-air (terrestrial) built-in tuners.
- [0020] Digital and interactive TV systems provide a comprehensive amount of TV channels and programs. A conventional structure receiving program contents receives a transport stream via a tuner. In order for viewing a first program content and processing a second program content, the receiver-decoder should have two tuners, which also enables various types of services including interactive functions such as picture-in-picture.
- [0021] The signal processing device in the form of an image display device in accordance with the invention can be connected to a set-top box, the latter having a first tuner (1) and a second tuner (2). The image display device itself or the receiver (set-top box) can therefore have multiple tuners as well as a first and second demodulator (3, 4) suitable for receiving broadcast multimedia content. In this regard, receivers capable of receiving and tuning to signals of different generations (e.g. DVB-T and DVB-T2, DVB-S and DVB-S2, DVB-C and DVB-C2) can be in use. Conventionally, a digital TV processor (6) simultaneously processing two program contents, a memory unit (5) associated with the digital TV processor (6), a feeding unit (7) in connection with all other components and a display unit (8) form part of the system. The memory unit (5) typically serves for storing the operating and interface software and channel database.
- [0022] Each of the first and second tuners (1, 2) is connected to a terrestrial antenna (9) or a satellite dish (10). The first tuner (1) can also process programs received via cable broadcasting, if any. Conventionally, signal received from the terrestrial antenna (9) or satellite dish (10) is converted to IF signal (Intermediate frequency), which can then be processed by the respective first or second demodulators (3, 4). The demodulators typically

output transport streams to the digital TV processor (6), which accordingly processes the transport streams and retrieves channel information for all the channels.

- [0023] When processing the signal received from the satellite dish (10), specific transponder information of each channel is retrieved. A transponder typically receives a television signal from the satellite uplink stations on the ground, encoding, amplifying and rebroadcasting the same. Transponder parameters typically involve satellite name, transponder frequency in MHz, polarization, symbol rate in Ksym/s etc.
- [0024] Frequency bands allocated to terrestrial or cable broadcasting services using radio signals are scanned by the image display device or the receiver/set-top box such that all television broadcasting signals are searched. Typically, an initial scanning frequency and a search interval are determined and sequential or incremental search is performed so that signals within the entire band are scanned. Frequencies in all television broadcasting channels within a bandwidth are thereby recorded.
- [0025] The signal processing device can be factory-configured such that channel frequency information, i.e. frequency values for each channel, is preloaded for a plurality of channels. Likewise, the image display device can be factory-configured to have a satellite's transponder list. However, as the actual transponder list of a satellite can expand in time so as to accommodate new entries along with old ones, a channel whose transponder information is not updated will typically be viewed as a blank screen during channel surfing.
- [0026] The present invention proposes a system and a method for operating an image display device, having an accelerated channel information retrieving operation as delineated below. The automatic channel information retrieving operation of the invention can be automatically called on a periodical basis by setting a time interval such that frequency values/range or transponder information in association with a given channel is processed and channels that exhibit signal error are automatically cleared.
- [0027] To this end, the signal processing device of the present invention executes the method of retrieving channel information to be implemented in the

following manner: The signal processing device is first configured by the user to initiate automatic channel information retrieving operation. The signal processing device initiates the operation based on the preloaded frequency ranges or transponder list. Television broadcasting signals are searched and parameters such as frequency, symbol rate and polarization of a transponder are fed to the respective demodulator to verify whether signal lock is achieved. Alternatively, a so-called blind search can be carried out in the manner that signals within the entire band are scanned or the signal processing device steps through a range of transponders.

[0028] According to the invention, the signal processing device starts the channel information retrieving operation by way of simultaneously scanning terrestrial and cable frequencies and updating the transponder list. Channels on terrestrial frequencies or cable television frequencies transmitted via radio signals through coaxial cables or light pulses through fiber-optic cables as well as satellite channels are simultaneously searched by the two separate tuners. Therefore, the only stage during which the user will have to wait for the completion of the process before taking control of the image display device is the initial stage of the channel information retrieving operation during which terrestrial and cable frequencies are scanned as the number of channels on terrestrial frequencies or cable television frequencies is much less than the number of satellite channels. When the first stage is completed, channels whose frequencies were determined and stored in memory can be viewed while the second tuner (2), i.e. the satellite tuner generates or updates the transponder list.

[0029] The duration of the channel information retrieving operation directly noticeable by the user is therefore substantially shorter than the total duration thereof. Therefore, the present invention ensures that the duration during which the user has no access to TV programs is substantially shorter than the total duration of the network scan operation.

[0030] The second stage of the channel information retrieving operation carried out without intervention of the user according to the present invention is a passive stage during which the user can regularly enjoy TV viewing. As a

plurality of TV broadcasting channels' frequencies within a bandwidth are recorded during the first stage of the channel information retrieving operation where terrestrial and/or cable television frequencies are scanned, the user is able to view already recorded broadcasting channels while the second stage search continues.

[0031] Consequently, the present invention proposes a signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor (6), a first tuner (1) and a second tuner (2), the first tuner (1) and second tuner (2) being respectively in association with a first and second demodulator (3, 4) which supply transport streams, the signal processing device further communicating with a display unit (8).

[0032] According to one embodiment of the present invention, the digital TV processor (6) is configured to simultaneously effect initiation of a first stage of channel information retrieving operation by means of the first tuner (1), the first stage being succeeded by recording of retrieved broadcasting channels during the first stage, and simultaneous initiation of a second stage of the channel information retrieving operation by means of the second tuner (2) such that broadcasting channels retrieved using the first tuner (1) are viewable during at least a part of the second stage of the channel information retrieving operation. Therefore the first and second stages are simultaneously initiated; but the second one taking longer time, the user is allowed to view channels retrieved by the first tuner while the second tuner's operation goes on.

[0033] In a further embodiment of the present invention, the first tuner (1) scans frequency bands allocated to terrestrial or cable broadcasting services.

[0034] In a further embodiment of the present invention, the first tuner (1) is a DVB-T, DVB-T2, DVB-C and/or DVB-C2 tuner.

[0035] In a further embodiment of the present invention, the first tuner (1) is connected to a terrestrial antenna (9).

[0036] In a further embodiment of the present invention, the second stage of channel information retrieving operation is carried out by the second tuner (2) during at least a part of which retrieved broadcasting channels are viewable using the first tuner (1).

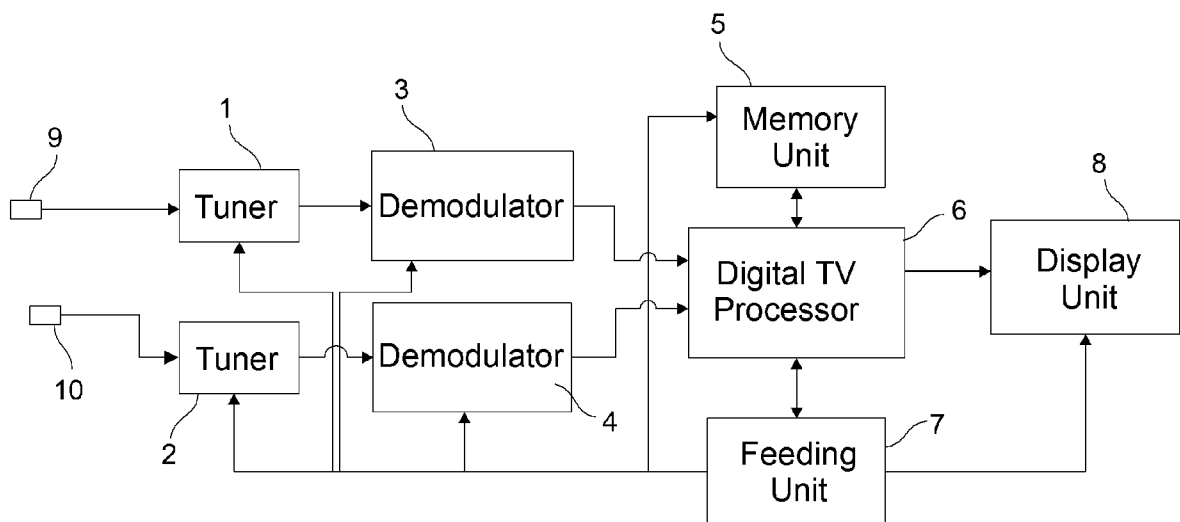
- [0037] In a further embodiment of the present invention, the second tuner (2) performs update of transponders in association with a satellite.
- [0038] In a further embodiment of the present invention, the second tuner (2) is a DVB-S and/or DVB-S2 tuner.
- [0039] In a further embodiment of the present invention, the second tuner (2) is connected to a satellite dish (10).
- [0040] In a further embodiment of the present invention, the signal processing device is an image display device or a set-top box.
- [0041] In this regard, the present invention ensures that configuration of channel information settings can be better managed in a less intrusive and substantially shorter manner such that users are offered a less troublesome viewing experience without having to wait for a substantial amount of time for completion of the automatic network scan task. The present invention therefore substantially accelerates maintenance of the channel information without requiring user intervention.

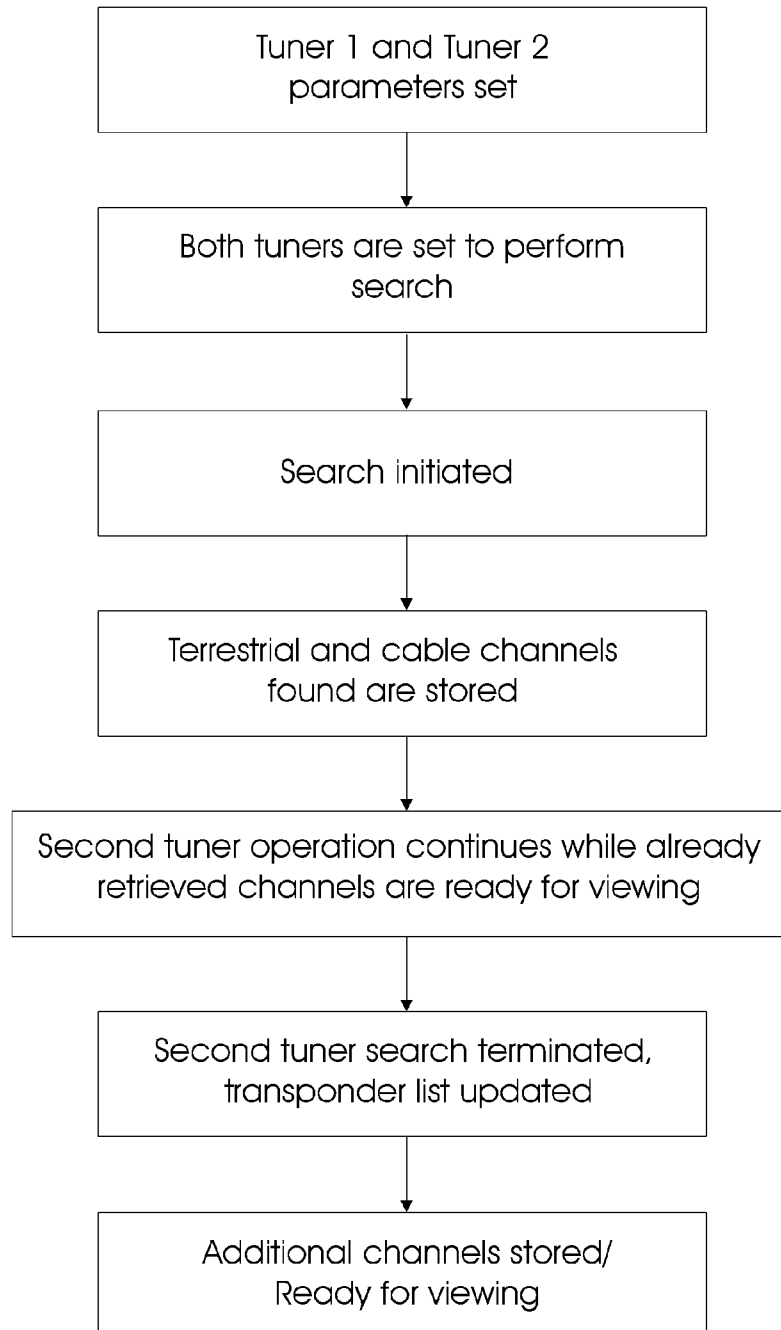
Claims

1. A signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor (6), a first tuner (1) and a second tuner (2), the first tuner (1) and second tuner (2) being respectively in association with a first and second demodulator (3, 4) which supply transport streams, the signal processing device being further able to communicate with a display unit (8), **characterized in that**
the digital TV processor (6) is configured to simultaneously effect initiation of a first stage of channel information retrieving operation by means of the first tuner (1), the first stage being succeeded by recording of retrieved broadcasting channels during the first stage and simultaneous initiation of a second stage of the channel information retrieving operation by means of the second tuner (2) such that broadcasting channels retrieved using the first tuner (1) are viewable during at least a part of the second stage of the channel information retrieving operation.
2. A signal processing device as in Claim 1, **characterized in that** the first tuner (1) scans frequency bands allocated to terrestrial or cable broadcasting services.
3. A signal processing device as in Claim 2, **characterized in that** the first tuner (1) is a DVB-T, DVB-T2, DVB-C and/or DVB-C2 tuner.
4. A signal processing device as in Claim 2, **characterized in that** the first tuner (1) is connected to a terrestrial antenna (9).
5. A signal processing device as in Claim 2, 3 or 4, **characterized in that** the second stage of channel information retrieving operation is carried out by the second tuner (2) during at least a part of which retrieved broadcasting channels are viewable using the first tuner (1).
6. A signal processing device as in Claim 5, **characterized in that** the second tuner (2) performs update of transponders in association with a satellite.
7. A signal processing device as in Claim 6, **characterized in that** the second tuner (2) is a DVB-S and/or DVB-S2 tuner.
8. A signal processing device as in Claim 6, **characterized in that** the second tuner (2) is connected to a satellite dish (10).
9. A signal processing device as in any preceding Claims, **characterized in that**

the signal processing device is an image display device or a set-top box.

Fig. 1





INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2014/079044

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04N5/50 H04N21/426 H04N5/44
ADD.

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, INSPEC, WPI Data, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EP 2 512 129 A1 (MITSUBISHI ELECTRIC CORP [JP]) 17 October 2012 (2012-10-17) paragraph [0015] - paragraph [0019]; figures 1-4 paragraph [0022] - paragraph [0031] paragraph [0036] - paragraph [0038] paragraph [0040] - paragraph [0081] -----	1-9
X	US 2007/204291 A1 (ICHIHASHI NOBUHARU [JP]) 30 August 2007 (2007-08-30) paragraph [0020] paragraph [0045] paragraph [0052] - paragraph [0055] paragraph [0109] - paragraph [0110] paragraph [0164]; figures 2,4,7 ----- -/-	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

6 February 2015

Date of mailing of the international search report

17/02/2015

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2014/079044

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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