Title: IMAGE RECEIVING APPARATUS AND METHOD THEREOF

Abstract: An image receiving apparatus and a method thereof are disclosed. The method includes judging a color system of a first image signal, storing the judged color system of the first image signal, storing the color system of the first image signal as a color system of a second image signal different from the first image signal, and setting a decoding method for an image signal received out of the first image signal and the second image signal by a decoding method according to the stored color system of the first image signal. According to this, in broadcasting channel change or external input change, images under display can be more quickly switched or converted.
Description

IMAGE RECEIVING APPARATUS AND METHOD THEREOF

Technical Field

The present invention relates generally to an image receiving apparatus for quick image switching and a method thereof. More particularly, the present invention relates to an image receiving apparatus and a method thereof capable of more quickly converting or switching images under display when the images under display should be switched due to a broadcasting channel change, an external input change or the like.

Background Art

An image receiving apparatus is an apparatus, which receives images transmitted from image sources, such as broadcasting channels, external inputs, etc. As typical examples of the image receiving apparatus, there are known a television (TV) and a set top box (STB).

If a broadcasting channel is changed, an image displayed on the image receiving apparatus is converted or switched. Hereinafter, a process by which an image switching is executed will be explained in detail.

At the beginning of the image switching, a video mute operation is carried out, and thereby received images are not displayed on a screen. As the video mute operation is carried out as described above, a transitional phenomenon, which images are flicked and slashed in process of the image switching, is not shown on the screen.

After the video mute operation is carried out, the image receiving apparatus discriminates or judges a color system of changed image signals. Judging the color system of the changed image signals takes a lot of times.

When the judging operation is completed, the image receiving apparatus sets a decoder to decode the received image signals according to a decoding method adapted to the judged color system. And the image receiving apparatus sets up facts related to an image signal processing, and then releases the video mute operation. As a result, the images received from the changed broadcasting channel are displayed on the screen.

The conventional image receiving apparatus as described above is disadvantageous in that in broadcasting channel change, a video mute time, which is a time from a starting point of time to a releasing point of time of the video mute operation, is very long. This is because judging the color system of the changed image signals takes a lot of times.

Since during the video mute time, the received images are not displayed on the screen, if the video mute time is lengthened, a problem occurs, in that a user feels dull.

Disclosure of Invention
Technical Problem

An aspect of the present invention is to solve at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present invention is to provide an image receiving apparatus and a method thereof capable of more quickly converting or switching images under display, thereby reducing a video mute time, when the images under display should be switched due to a broadcasting channel change, an external input change or the like.

Technical Solution

According to another aspect of an exemplary embodiment of the present invention,

Preferably, but not necessarily, the method further includes changing and storing a color system of the received image signal into and by a color system different from the color system of the first image signal when the color system of the decoded, received image signal is decided as the color system different from the color system of the first image signal, and changing and setting the decoding method for the received image signal into and by a decoding method according to the stored different color system.

Preferably, but not necessarily, the method further includes setting up facts related to an image signal processing of the decoded image signal when a color system of the decoded, received image signal is decided as the color system of the first image signal.

The first image signal may be one of a broadcast signal and an external input signal, and the color system of the first image signal may be one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a systems equential couleur a memoire (SECAM) system.

The second image signal may be one of a broadcast signal and an external input signal, and the color system of the second image signal may be one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a systems equential couleur a memoire (SECAM) system.

Preferably, but not necessarily, the first image signal includes an image signal first received after a power switch is turned on.

According to another aspect of an exemplary embodiment of the present invention,
there is provided an image receiving apparatus, including a decoding unit to decode a supplied image signal, a storing unit to store information on a color system of a first image signal, and a control unit to set a decoding method of the decoding unit for an image signal received out of the first image signal and a second image signal different from the first image signal by a decoding method according to the color system of the first image signal stored in the storing unit.

Preferably, but not necessarily, the decoding unit decodes the received image signal in the set decoding method under a control of the control unit.

Preferably, but not necessarily, the control unit stores a color system different from the color system of the first image signal as information on a color system of the received image signal when a color system of the decoded, received image signal is decided as the color system different from the color system of the first image signal, and changes and sets the decoding method of the decoding unit for the received image signal into and by a decoding method according to the different color system stored in the storing unit.

Preferably, but not necessarily, the apparatus further includes an image signal processing unit to carry out an image signal processing on the image signal decoded by the decoding unit, and when a color system of the decoded, received image signal is decided as the color system of the first image system, the control unit sets up facts related to the image signal processing of the image signal processing unit on the decoded image signal.

The first image signal may be one of a broadcast signal and an external input signal, and the color system of the first image signal may be one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a systems sequential couleur a memoire (SECAM) system.

The second image signal may be one of a broadcast signal and an external input signal, and the color system of the second image signal may be one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a systems sequential couleur a memoire (SECAM) system.

Preferably, but not necessarily, the first image signal includes an image signal first received after a power switch is turned on.

According to still another aspect of an exemplary embodiment of the present invention, there is provided an image receiving method, including: judging a first color system, which is a color system of an image signal received from a first image source, and setting a decoding method to be carried out for the first image source and a second image source by a decoding method adapted to the first color system.

Preferably, but not necessarily, the method further includes changing and setting a decoding method to be carried out for the second image source into and by a decoding
method adapted to the second color system when a color system of an image signal
decoded and received from the second image source is decided as a second color
system different from the first color system.

[26] The image sources may be a plurality of broadcasting channels. Particularly, the
first image source may be a broadcasting channel, which provides a broadcast signal
first receiving after a power switch is turned on.

[27] Also, the image sources may be a plurality of external inputs. Particularly, the first
image source may be an external input, which provides an image signal first receiving
after a power switch is turned on.

[28] Preferably, but not necessarily, the method further includes displaying an image
corresponding to an image signal, which is image signal-processed after being
decoded.

[29] The first color system may be one of a national television system committee
(NTSC) system, a phase alternation line (PAL) system and a systems equential couleur
a memoire (SECAM) system.

[30] According to further another aspect of an exemplary embodiment of the present
invention, there is provided an image receiving apparatus, including a decoding unit to
decode image signals received from image sources, and a control unit to judge a first
color system, which is a color system of an image signal received from a first image
source out of the image sources, and to set a decoding method to be carried out by the
decoding unit for the first image source and a second image source by a decoding
method adapted to the first color system.

[31] Preferably, but not necessarily, the control unit changes and sets a decoding method
to be carried out by the decoding unit for the second image source into and by a
decoding method adapted to the second color system when a color system of an image
signal decoded by the decoding unit after received from the second image source is
decided as a second color system different from the first color system.

[32] The image sources may be a plurality of broadcasting channels. Particularly, the
first image source may be a broadcasting channel, which provides a broadcast signal
first receiving after a power switch is turned on.

[33] Also, the image sources may be a plurality of external inputs. Particularly, the first
image source may be an external input, which provides an image signal first receiving
after a power switch is turned on.

[34] Preferably, but not necessarily, the apparatus further includes a displaying unit to
display an image corresponding to an image signal, which is image signal-processed
after being decoded by the decoding unit.

[35] The first color system may be one of a national television system committee
(NTSC) system, a phase alternation line (PAL) system and a systems equential couleur
a memoire (SECAM) system.

According to moreover another aspect of an exemplary embodiment of the present invention, there is provided an image receiving method, including: judging a first color system, which is a color system of an image signal received from a first image source, and storing a first color system as information on color systems of the first image source and a second image source.

According to also another aspect of an exemplary embodiment of the present invention, there is provided an image receiving method, including: judging a color system of a broadcast signal received from one of a plurality of broadcasting channels, setting a decoding method to be carried out for the plurality of broadcasting channels by a decoding method adapted to the judged color system, and when the broadcasting channel is changed, decoding a broadcast signal received from the changed broadcasting channel in the set decoding method without judging a color system thereof.

Preferably, but not necessarily, the method further includes changing and setting a decoding method to be carried out for the changed broadcasting channel into and by a decoding method adapted to a color system different from the judged color system when the color system of the broadcast signal received from the changed broadcasting channel is decided as the color system different from the judged color system after the decoding.

The judging may include judging a color system of a broadcast signal first received after a power switch is turned on.

Advantageous Effects

As explained as above, according to the exemplary embodiment of the present invention, the image receiving apparatus and the method thereof are configured, so that if there is a broadcasting channel change or an external input change, images under display are converted or switched with the step of judging the color system of the changed image signal omitted, thereby allowing the images under display to be more quickly switched. Accordingly, the video mute time is reduced, and thereby a user does not feel dull in image switching.

(Description Of Drawings)

FIG. 1 is a block diagram exemplifying an image receiving apparatus for quick image switching in accordance with an exemplary embodiment of the present invention;

FIG. 2 is a flowchart exemplifying a process, which the image receiving apparatus illustrated in FIG. 1 stores color systems to broadcasting channels and external inputs; and
FIG. 3 is a flowchart exemplifying a process, which the image receiving apparatus illustrated in FIG. 1 carries out an image switching.

Best Mode for Carrying Out the Invention

Hereinafter, an image receiving apparatus and a method thereof in accordance with exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawing figures.

FIG. 1 is a block diagram exemplifying an image receiving apparatus in accordance with an exemplary embodiment of the present invention. The image receiving apparatus of the exemplary embodiment of the present invention can more quickly carry out an image switching when images under display should be switched due to a broadcasting channel change, an external input change or the like.

The image receiving apparatus in accordance with the exemplary embodiment of the present invention having the function as described above is provided with a tuner 110, an external input unit 120, a switching unit 130, a decoding unit 140, an image signal processing unit 150, a video driving unit 160, a displaying unit 170, a control unit 180 and a memory 190, as illustrated in FIG. 2.

The tuner 110 selects any one of broadcast signals received by wireless or wire, and demodulates and outputs the selected broadcast signal.

The external input unit 120 receives image signals from several external devices connected thereto. The external input unit 120 is provided with several external input terminals to which the several external devices are connected, respectively. The external input terminals provided on the external input unit 120 may include a composite input terminal, a component input terminal, a S-video input terminal, a high definition multimedia interface (HDMI) input terminal, etc.

The switching unit 130 switches to transmit any one of an output signal of the tuner 110 and an output signal of the external input unit 120 to the decoding unit 140, which will be described below. The switching operation of the switching unit 130 is controlled by the control unit 180 to be described later.

The decoding unit 140 decodes an image signal transmitted from the switching unit 130. Here, the decoding method is determined by the control unit 180.

The image signal processing unit 150 carries out image signal processing procedures, such as a color signal processing, an image quality-improving processing and the like, to the image signal decoded by the decoding unit 140. The video driving unit 160 controls an image outputted from the image signal processing unit 150 to display on the displaying unit 170.

The control unit 180 controls a general operation of the image receiving apparatus. Particularly, the control unit 180 stores information on color systems of image signals
received or to be received through the tuner 110 or the external input unit 120 in the memory 190. In addition, the control unit 180 controls the decoding unit 140 to decode the received image signal according to a decoding method adapted to the color system stored in the memory 190. Also, if necessary, the control unit 180 changes the color system stored in the memory 190 and stores the changed color system in the memory 190.

Hereinafter, a process, which the image receiving apparatus in accordance with the exemplary embodiment of the present invention stores the color systems to broadcasting channels and external inputs, will be described in detail with reference to FIG. 2.

As illustrated in FIG. 2, when the image receiving apparatus is first turned on (S210-Y), the control unit 180 decides an operation mode of the image receiving apparatus (S220 and S250). There are a broadcasting-receiving mode and an external input receiving mode in the operation mode of the image receiving apparatus.

The broadcasting-receiving mode is an operation mode, which an image received through the tuner 110 is displayed on the displaying unit 170, and the external input receiving mode is an operation mode, which an image received through the external input unit 120 is displayed on the displaying unit 170. There are a composite receiving mode, a component receiving mode, a S-video receiving mode, a HDMI receiving mode, etc in the external input-receiving mode.

In the broadcasting-receiving mode, an image source is broadcasting channels, and in the external input receiving mode, an image source is external inputs.

If the operation mode of the image receiving apparatus is decided as the broadcasting-receiving mode (S220-Y), the control unit 180 judges a color system to a broadcast signal (an image signal) of a broadcasting channel first received through the tuner 110 (S230). There are a national television system committee (NTSC) system, a phase alternation line (PAL) system, a systems sequential couleur a memoire (SECAM) system, etc in the color system.

The control unit 180 stores the color system judged at the step S230 as color systems to all of the broadcasting channels in the memory 190 (S240). For instance, if the broadcasting channels exists as CH 1 through CH 99 and the broadcasting channel first received is CH 10 and the color system of the CH 10 judged as the step S230 is a NTSC system, the control unit 180 stores the NTSC system as color systems to the broadcasting channels of CH 1 through CH 99 in the memory 190, at the step S240.

On the other hand, if the operation mode of the image receiving apparatus is decided as the external input receiving mode (S250-Y), the control unit 180 judges a color system to an image signal of an external input first received through the external input unit 120 (S260). As described above, there are a NTSC system, a PAL system, a
SECAM system, etc. in the color system.

The control unit 180 stores the color system judged at the step S260 as color systems to all of the external inputs in the memory 190 (S270). For instance, if the external inputs exists as a composite input, a component input, a S-video input and a HDMI input and the external input first received is a component input and the color system of the component input judged as the step S260 is a PAL system, the control unit 180 stores the PAL system as color systems to the composite input, the component input, the S-video input and the HDMI input in the memory 190. at the step S270.

Next, a process, which the image receiving apparatus illustrated in FIG. 1 carries out an image switching, will be described in detail with reference to FIG. 3.

As illustrated in FIG. 3, when a broadcasting channel-changing command or an external input-changing command is inputted (S310-Y), a video mute operation is carried out, and thereby received images are not displayed on the displaying unit 170 (S320).

The control unit 180 sets the decoding unit 140 to decode a received image signal according to a decoding method adapted to the color system stored in advance in the memory 190 (S330). Here, the stored color system is a color system to the changed broadcasting channel or the changed external input among the color systems stored at the step S240 and S270 of FIG. 2.

As described above, in the exemplary embodiment of the present invention, if there is the broadcasting channel change or the external input change, the control unit 180 does not judge a color system to the image signal received from the changed broadcasting channel or the changed external input, but controls to decode the image signal according to the stored color system.

After that, the control unit 180 decides whether the color system of the decoded image signal and the stored color system coincide with each other (S340).

If it is decided that the two parties coincide with each other (S340-Y), the control unit 180 sets up facts related to an image signal processing operation of the image signal processing unit 150 (S350). After that, the video mute operation is released, and thereby images received from the changed broadcasting channel or the changed external input are displayed on the playing unit 170 (S360).

On the other hand, if the two parties do not coincide with each other (S340-N), the control unit 180 judges the color system of the decoded image signal (S370).

The control unit 180 changes the setting of the decoding unit 140 to decode the received image signal according to a decoding method adapted to the color system judged at the step S370 (S380).

Also, the control unit 180 changes the color system to the changed broadcasting channel or the changed external input into the color system judged at the step S370 and
stores the changed color system in the memory 190 (S390).

[71] After that, steps S350 and S360 are carried out.

[72] In the exemplary embodiment of the present invention, although the image receiving apparatus and the method thereof have been explained as only using the NTSC system, the PAL system, and the SECAM system as the color system, the present invention is not limited thereto, but applicable to an image receiving apparatus and a method thereof, which receive an image signal according to other color system in the same principle and construction.

[73] Also, in the exemplary embodiment of the present invention, the image receiving apparatus has been explained that it stores the color system of the image signal "first" received from the broadcasting channel/the external input after "first" turned on as the color systems to "all" of the broadcasting channels/the external inputs. However, that is only an example for explanatory convenience, and the present invention is not limited to a) the case that the image receiving apparatus is "first" turned on, b) the image signal "first" received from the broadcasting channel/the external input, and c) "all" of the broadcasting channels/the external inputs.

[74] The image receiving apparatus illustrated in FIG. 1 is only an exemplary embodiment of the present invention. Accordingly, the present invention will not limit to include all of the blocks illustrated FIG. 1 in the image receiving apparatus, and unnecessary blocks may be omitted from the image receiving apparatus. For instance, if the image receiving apparatus is a set top box (STB), it will be embodied to omit the displaying unit 170.

[75] Although representative exemplary embodiments of the present invention have been shown and described in order to exemplify the principle of the present invention, the present invention is not limited to the specific exemplary embodiments. It will be understood that various modifications and changes can be made by one skilled in the art without departing from the spirit and scope of the invention as defined by the appended claims. Therefore, it shall be considered that such modifications, changes and equivalents thereof are all included within the scope of the present invention.

**Industrial Applicability**

[76] The present invention is applicable to an image receiving apparatus, such as a television (TV), a set top box (STB) or the like, which can receive broadcasting stations through broadcasting channels, external inputs, etc.
Claims

[1] An image receiving method, comprising:
judging a color system of a first image signal;
storing the judged color system of the first image signal;
storing the color system of the first image signal as a color system of a second
image signal different from the first image signal; and
setting a decoding method for an image signal received out of the first image
signal and the second image signal by a decoding method according to the stored
color system of the first image signal.

[2] The method of claim 1, further comprising:
decoding the received image signal in the set decoding method.

[3] The method of claim 2, further comprising:
when a color system of the decoded, received image signal is decided as a color
system different from the color system of the first image signal, changing and
storing the color system of the received image signal into and by the different
color system; and
changing and setting the decoding method for the received image signal into and
by a decoding method according to the stored different color system.

[4] The method of claim 2, further comprising:
when a color system of the decoded, received image signal is decided as the
color system of the first image signal, setting up facts related to an image signal
processing of the decoded image signal.

[5] The method of claim 1, wherein the first image signal comprises one of a
broadcast signal and an external input signal, and the color system of the first
image signal comprises one of a national television system committee (NTSC)
system, a phase alternation line (PAL) system and a systems equential couleur a
memoire (SECAM) system.

[6] The method of claim 1, wherein the second image signal comprises one of a
broadcast signal and an external input signal, and the color system of the second
image signal comprises one of a national television system committee (NTSC)
system, a phase alternation line (PAL) system and a systems equential couleur a
memoire (SECAM) system.

[7] The method of claim 1, wherein the first image signal comprises an image signal
first received after a power switch is turned on.

[8] An image receiving apparatus, comprising:
a decoding unit to decode a supplied image signal;
a storing unit to store information on a color system of a first image signal; and
a control unit to set a decoding method of the decoding unit for an image signal received out of the first image signal and a second image signal different from the first image signal by a decoding method according to the color system of the first image signal stored in the storing unit.

[9] The apparatus of claim 8, wherein the decoding unit decodes the received image signal in the set decoding method under a control of the control unit.

[10] The apparatus of claim 9, wherein the control unit stores a color system different from the color system of the first image signal as information on a color system of the received image signal when the color system of the decoded, received image signal is decided as the color system different from the color system of the first image signal, and changes and sets the decoding method of the decoding unit for the received image signal into and by a decoding method according to the different color system stored in the storing unit.

[11] The apparatus of claim 9, further comprising:
an image signal processing unit to carry out an image signal processing on the image signal decoded by the decoding unit,
wherein when a color system of the decoded, received image signal is decided as the color system of the first image system, the control unit sets up facts related to the image signal processing of the image signal processing unit on the decoded image signal.

[12] The apparatus of claim 8, wherein the first image signal comprises one of a broadcast signal and an external input signal, and the color system of the first image signal comprises one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a sequential couleur a memoire (SECAM) system.

[13] The apparatus of claim 8, wherein the second image signal comprises one of a broadcast signal and an external input signal, and the color system of the second image signal comprises one of a national television system committee (NTSC) system, a phase alternation line (PAL) system and a sequential couleur a memoire (SECAM) system.

[14] The apparatus of claim 8, wherein the first image signal comprises an image signal first received after a power switch is turned on.
[Fig. 2]

START

S210 - APPARATUS IS FIRST TURNED ON?

Y

S220 - BROADCASTING-RECEIVING MODE?

Y

S230 - JUDGING COLOR SYSTEM TO BROADCAST SIGNAL FIRST RECEIVED

S240 - STORING COLOR SYSTEMS TO ALL OF BROADCASTING CHANNELS BY JUDGED COLOR SYSTEM

N

S250 - EXTERNAL INPUT RECEIVING MODE?

Y

S260 - JUDGING COLOR SYSTEM TO EXTERNAL INPUT FIRST RECEIVED

S270 - STORING COLOR SYSTEMS TO ALL OF EXTERNAL INPUTS BY JUDGED COLOR SYSTEM

END
START

S310  BROADCASTING CHANNEL-CHANGING COMMAND OR EXTERNAL INPUT-CHANGING COMMAND?

S320  CARRYING VIDEO MUTE OPERATION

S330  SETTING TO DECODE RECEIVED IMAGE SIGNAL ACCORDING TO DECODING METHOD ADAPTED TO STORED COLOR SYSTEM

S340  COLOR SYSTEM OF DECODED IMAGE SIGNAL IS STORED COLOR SYSTEM?

Y  JUDGING COLOR SYSTEM TO DECODED IMAGE SIGNAL

S370  SETTING TO DECODE RECEIVED IMAGE SIGNAL ACCORDING TO DECODING METHOD ADAPTED TO JUDGED COLOR SYSTEM

S380  CHANGING COLOR SYSTEM TO CHANGED BROADCASTING CHANNEL OR CHANGED EXTERNAL INPUT INTO JUDGED COLOR SYSTEM AND STORING CHANGED COLOR SYSTEM

S390  SETTING UP FACTS ON IMAGE SIGNAL PROCESSING

S360  RELEASING VIDEO MUTE OPERATION

END
A. CLASSIFICATION OF SUBJECT MATTER

H04N 5/44(2006.01)i

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 Utility models and applications for Utility models since 1975
Japanese 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 CHANNEL CHANGE, MUTE, COLOR SYSTEM, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C

Date of the actual completion of the international search
20 SEPTEMBER 2007 (20 09 2007)

Date of mailing of the international search report
20 SEPTEMBER 2007 (20.09.2007)

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
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Facsimile No 82-42-472-7140

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