Description

The invention relates to a television system having a picture-in-picture television receiver, including a display means with a screen capable of displaying a main picture and at least one picture-in-picture, a plurality of sources of information for display as said main picture and said at least one picture-in-picture, manually operable control means for controlling at least one feature of said main picture and for controlling at least one feature of a predetermined picture-in-picture, selection means for selecting whether said control means controls said at least one feature of said main picture or said at least one feature of said predetermined picture-in-picture in response to manual operation, and an indicating means generator for displaying indicating means on said screen.

Picture-in-picture (PIP) television receivers have been known for a number of years. One of the characteristics of these receivers in the past was that the controls were unduly complicated if a viewer were to be given the same control over the PIP-display as he could exercise over the main picture.

A PIP-television receiver of the kind mentioned in the opening paragraph is disclosed in Patent Abstract of Japan, Vol.6, Number 218, JP-A-57 121376. The known receiver comprises common control means for controlling both the main picture and the picture-in-picture. Normally, the main picture is controlled. PIP-control requires the respective control means and the selection means to be operated simultaneously. This is annoying to the user and requires complicated circuitry in remote controllable systems.

It is an object of the invention to overcome the disadvantages mentioned above and to provide an easy-to-control PIP-television receiver.

The system according to the invention is characterized in that the indicating means generator is responsive to said selection means to cause said display means to display on said screen indicating means indicating which of said pictures said control means will control upon manual operation.

The indicating means thus indicate whether the main picture or picture-in-picture is subsequently controlled by the manual operation means. This allows the selection means to be implemented as a toggle switch toggling between a main picture control mode and a PIP control mode, in both modes the same controls being available to the user. Pressing two switches simultaneously is not required.

In a further embodiment of the invention, the receiver is capable of receiving a predetermined number of channels. The system also has display means with a screen capable of providing a picture-in-picture display whereby the display means displays a main picture of information received from a first channel being received by said receiver and whereby the display means displays a smaller picture than the main picture of information received from a second channel being received by the television receiver. The system includes first tuner means for switching the main picture from the first channel to any other of the predetermined number of channels received by the television receiver. The system also includes second tuner means capable of switching the smaller picture from the second channel to any other of the predetermined number of channels received by the television receiver.

The system includes a common control means for enabling either the first tuner means or the second tuner means to switch channels. Also provided are manual selection means for selecting which of the tuner means the control means will enable. The receiver also includes an indicating means generator which is enabled by the control means to cause the display means to display on the screen indicating means indicating which of the tuner means is enabled.

Other objects, features and advantages of the invention will become apparent to those skilled in the art upon considering the following description when taken in conjunction with the appended claims and the accompnaying drawing, in which:

Figure 1 is a simplfied block diagram schematic of a picture-in-picture television receiver including the invention of this application;

Figure 2 is a representation of a remote control unit for use with the invention;

Figure 3 is a representation of the screen of the television receiver of Figure 1 with a display different from that of Figure 1; and

Figure 4 is a representation of the screen of the television receiver of Figure 1 with a still different display than either that of Figure 1 or Figure 3.

Referring to Figure 1 there is shown therein a simplified block diagram useful for illustrating the invention. It is to be understood that an up-to-date design for a picture-in-picture television receiver would probably include microprocessor controlled equipment. From the following description anyone skilled in the television art will understand how to practice the invention with such a microprocessor controlled television receiver.

Shown in Figure 1 is antenna 11 connected to first tuner means 13 and second tuner means 15. Tuners 13 and 15 are connected to common control means 17 to receive input signals therefrom along lines 13L and 15L. Their outputs are connected to switch 19 by lines 20 and 21. Switch 19 has a plurality of additional inputs 22, 23 and 25 for receiving inputs from additional information sources 26, which may take the form of video cassette recorders, video disc players, cable television systems, etc. and may produce traditional video, alpha-numeric data or other information for display.

Control means 17 applies an input signal to switch 19 along line 26 to control which signal along

lines 20, 21, 22, 23 or 25 switch 19 will apply along lines 27 and 29 to audio/video control circuitry 31. As those skilled in the art will understand, such control circuitry includes for example, main picture audio and video I.F. stages, picture-in-picture video I.F. stages, detector stages, mixer circuitry, output amplifiers and all of the other circuitry for a picture-in-picture television receiver. Circuitry 31 is connected to display 33 to cause it to display the main picture MD and the picture-in-picture display PD.

Control means 17 is also connected to audio/video control circuitry 31 for supplying signals thereto which, as will be explained, could be used to control which picture is displayed in the main display and which is displayed in the picture-in-picture display. Control means 17 is also connected to indicating means generator 35 for transmitting signals thereto to cause the audio/video control circuitry to produce an indicating means symbol in either the main picture or the picture-in-picture.

In the presently preferred embodiment, common control means 17 would include remote control transmitter 37, shown in Figure 2, together with a receiver in the picture-in-picture television set for receiving signals generated by remote control transmitter 37.

Remote control transmitter 37 includes an on/off button which turns the set on and causes control means 17 to transmit a signal to first tuner 13 to have it produce an input to switch 19 from the channel selected by tuner 13. Transmitter 37 also includes a PIP button which causes control means 17 to transmit a signal to second tuner 15 to produce an input to switch 19 from the channel selected by tuner 15. Numerical buttons 0-9 are used to select channels for the main picture display MD and the picture-in-picture display PD by channel number. The UP/DOWN buttons are used to change the tuners, one channel at a time either in the up direction or the down direction.

The X button is used to swap the channels being displayed by the main picture and the picture-in-picture display. In this respect, when the X button is pressed, the channel displayed in the main picture display becomes displayed in the picture-in-picture display and that which was displayed in the picture-in-picture display becomes the main picture. This can be done in either of two alternative ways. Assuming a picture is displayed in both displays, circuitry 31 could be caused to operate by a signal from control means 17 to switch the displays. Alternately, switch 19 could be caused to operate to switch the outputs on lines 27 and 29 from tuners 13 and 15. As is evident tuners 13 and 15 need not be dedicated to a particular display.

The M/P button enables control means 17 to select which tuner the remote will control in response to the operation of the 0-9 buttons and the UP/DOWN buttons.

An exemplary operation of the invention will be described in which it is assumed that the apparatus is displaying a channel received by first tuner 13 and another channel received by second tuner 15. It is also assumed that the M/P button is in the condition which causes the channel in the main picture display to change in response to the operation of the remote. As a result control means 17 causes indicating means 35 and audio/video control circuitry 31 to cause the main picture to display an indicating means in the form of asterisk 39 in the main picture in accordance with the signal transmitted by indicating means generator 35. This indicates to a viewer that the remote control buttons 0-9 and the UP/DOWN buttons control channel changing of the main picture MD.

If, under the above circumstances a viewer wishes to use the remote control transmitter 37 to change the channel on the picture-in-picture display PD, he need only press the M/P button which thereupon causes audio/video control circuitry 31 to place asterisk 39 in the picture-in-picture display as shown in Figure 3. At the same time, it causes control means 17 to disable control of channel changing of the main display and to enable control of channel changing of the picture-in-picture display.

An asterisk has been shown as the indicating means in Figures 1 and 3. However, this was only shown as a convenience in disclosing the invention. It is presently contemplated that a more desirable indicating means would employ an enhanced border along the left edge and upper edge of the picture-in-picture display when control of the channels in the picture-in-picture display exists. In color television sets, it is contemplated that this could be a yellow colored border. Such a border is illustrated in Figure 4 by the border 41 in Figure 4, which distinguishes from the thinner lines designating such borders in Figures 1 and 3. It is to be understood that if such a border were shown, the asterisk shown in Figures 1 and 3 would not be necessary. When channel control of the main picture exists the border for the picture-in-picture display would not be enhanced.

It is also contemplated that when a border such as 41 is used, instructions for telling a viewer which picture is under control of the remote transmitter could be written in the border. The use of a border 41 also affords one the capability of chaning the borders color to distinguish which picture is under control of the remote.

It is recognized that the use of the indicating means such as asterisk 35 would not be necessary in the main picture MD when the remote controller is enabled to control the main picture. The absence of the indicating means from the picture-in-picture display PD under such circumstances would be sufficient to inform a viewer which picture the remote control was then controlling. Alternatively, the indicating means could be used in the main picture and not in the picture-in-picture display PD. Under these circumstanc-

es, the absence of an indicating means would thereby indicate that the remote control was in control of the picture-in-picture display PD. The presence of the indicating means in the main picture would indicate that the remote control would be controlling the main picture.

It is to be understood that more than one picture-in-picture display could be produced, such as shown in Figure 4, with one in the upper right hand corner and one in the lower right hand corner without departing from the invention. In these circumstances additional PIP buttons could be provided and button M/P could be made to control a switch with as many outputs as pictures to be controlled. Selection could be performed in a predetermined manner, for example by rotation through the pictures. If the main picture was selected with a television with two picture-in-picture displays the next operation of the M/P button would select one of the picture-in-picture displays, the next operation of the button would select the other picture-in-picture display and the next operation would return selection to the main picture.

It is also to be understood that if additional information sources were connected to inputs 22, 23 and/or 25, additional switches could be provided on remote control transmitter 37 and that control means 17 could be adapted accordingly to control switch 19 so that the signals from these external sources could be displayed in either the main picture display or a picture-in-picture display. Alternatively, reserved channel numbers, such as 91, 92, 93, etc. could be used whereupon should a viewer input any one of these numbers control means 17 could cause switch 19 to connect the number's associated additional information source in place of the source that had been selected by button M/P to provide the selected picture so that the information from the associated information source could be displayed.

The invention is capable of being used to indicate that any feature of a picture on the screen may be controlled by the manual control means. Thus upon the selection of a particular picture by operation of the M/P button, for example, brightness and/or color could be changed by operation of the appropriate switch on the remote.

Various modifications to the above described arrangement of the invention will become evident to those skilled in the art. As a result, the arrangement described herein is for illustrative purposes and is not to be considered restrictive.

Claims

1. A television system having a picture-in-picture television receiver, including:

a display means (33) with a screen capable of displaying a main picture (MD) and at least one picture-in-picture (PD);

a plurality of sources of information (13,15,26) for display as said main picture and said at least one picture-in-picture;

manually operable control means (17,37) for controlling at least one feature of said main picture and for controlling at least one feature of a predetermined picture-in-picture;

selection means (M/P) for selecting whether said control means controls said at least one feature of said main picture or said at least one feature of said predetermined picture-in-picture in response to manual operation; and an indicating means generator (35) for displaying indicating means (39,41) on said screen,

characterized in that the indicating means generator (35) is responsive to said selection means (M/P) to cause said display means (33) to display on said screen indicating means (39,41) indicating which of said pictures said control means (17,37) will control upon manual operation.

2. A television system as claimed in Claim 1, wherein said indicating means is an image (39,41) associated with said predetermined one of said at least one picture-in-picture when said selection means (M/P) is operated to select said predetermined one for said control means to control.

3. A television system as claimed in Claim 1 or 2, wherein said indicating means is an image (39) associated with said main picture when said selection means is operated to select said main picture for said control means to control.

4. A television system as claimed in Claim 2 or 3, wherein said indicating means is a border (41) on at least part of the edge of said picture-in-picture.

5. A television system as claimed in Claim 4, wherein said border (41) is on the top and left side edges of said picture-in-picture.

6. A television system as claimed in Claim 1, wherein said manually operable control means (17,37) are adapted for switching said main picture from one of said sources of information (13,15,26) which it is capable of displaying to another such source and for switching said predetermined one of said at least one picture-in-picture from one of said sources of information which it is capable of displaying to another such source;

said selection means (M/P) are adapted for selecting whether said control means switches said main picture or said predetermined one of said at least one picture-in-picture between sources of information in response to manual operation, and

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es, the absence of an indicating means would thereby indicate that the remote control was in control of the picture-in-picture display PD. The presence of the indicating means in the main picture would indicate that the remote control would be controlling the main picture.

It is to be understood that more than one picture-in-picture display could be produced, such as shown in Figure 4, with one in the upper right hand corner and one in the lower right hand corner without departing from the invention. In these circumstances additional PIP buttons could be provided and button M/P could be made to control a switch with as many outputs as pictures to be controlled. Selection could be performed in a predetermined manner, for example by rotation through the pictures. If the main picture was selected with a television with two picture-in-picture displays the next operation of the M/P button would select one of the picture-in-picture displays, the next operation of the button would select the other picture-in-picture display and the next operation would return selection to the main picture.

It is also to be understood that if additional information sources were connected to inputs 22, 23 and/or 25, additional switches could be provided on remote control transmitter 37 and that control means 17 could be adapted accordingly to control switch 19 so that the signals from these external sources could be displayed in either the main picture display or a picture-in-picture display. Alternatively, reserved channel numbers, such as 91, 92, 93, etc. could be used whereupon should a viewer input any one of these numbers control means 17 could cause switch 19 to connect the number's associated additional information source in place of the source that had been selected by button M/P to provide the selected picture so that the information from the associated information source could be displayed.

The invention is capable of being used to indicate that any feature of a picture on the screen may be controlled by the manual control means. Thus upon the selection of a particular picture by operation of the M/P button, for example, brightness and/or color could be changed by operation of the appropriate switch on the remote.

Various modifications to the above described arrangement of the invention will become evident to those skilled in the art. As a result, the arrangement described herein is for illustrative purposes and is not to be considered restrictive.

Claims

1. A television system having a picture-in-picture television receiver, including:

a display means (33) with a screen capable of displaying a main picture (MD) and at least one picture-in-picture (PD);

a plurality of sources of information (13,15,26) for display as said main picture and said at least one picture-in-picture;

manually operable control means (17,37) for controlling at least one feature of said main picture and for controlling at least one feature of a predetermined picture-in-picture;

selection means (M/P) for selecting whether said control means controls said at least one feature of said main picture or said at least one feature of said predetermined picture-in-picture in response to manual operation; and an indicating means generator (35) for displaying indicating means (39,41) on said screen,

characterized in that the indicating means generator (35) is responsive to said selection means (M/P) to cause said display means (33) to display on said screen indicating means (39,41) indicating which of said pictures said control means (17,37) will control upon manual operation.

2. A television system as claimed in Claim 1, wherein said indicating means is an image (39,41) associated with said predetermined one of said at least one picture-in-picture when said selection means (M/P) is operated to select said predetermined one for said control means to control.

3. A television system as claimed in Claim 1 or 2, wherein said indicating means is an image (39) associated with said main picture when said selection means is operated to select said main picture for said control means to control.

4. A television system as claimed in Claim 2 or 3, wherein said indicating means is a border (41) on at least part of the edge of said picture-in-picture.

5. A television system as claimed in Claim 4, wherein said border (41) is on the top and left side edges of said picture-in-picture.

6. A television system as claimed in Claim 1, wherein said manually operable control means (17,37) are adapted for switching said main picture from one of said sources of information (13,15,26) which it is capable of displaying to another such source and for switching said predetermined one of said at least one picture-in-picture from one of said sources of information which it is capable of displaying to another such source;

said selection means (M/P) are adapted for selecting whether said control means switches said main picture or said predetermined one of said at least one picture-in-picture between sources of information in response to manual operation, and

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said indicating means (39,41) indicate which of said pictures said control means (17,37) will switch between sources of information upon manual operation to cause such switching.

7. A television system as claimed in Claim 1, further comprising first tuner means (13) for switching said main picture from a first channel to any other of a plurality of channels and second tuner means (15) for switching said picture-in-picture from a second channel to any other of a plurality of channels, wherein

said manually operable control means (17,37) are adapted for enabling either said first tuner means to operate to switch channels or said second tuner means to switch channels;

said selection means (M/P) are adapted for selecting which of the tuner means (13,15) said manually operable control means will enable; and said indicating means (39,41) indicate which of said tuner means (13,15) is enabled.

Patentansprüche

1. Ein Fernsehsystem mit einem Bild-im-Bild-Fernsehempfänger, das folgendes enthält:

ein Anzeigemittel (33) mit einem Bildschirm, der ein Hauptbild (MD) und mindestens ein Bild-im-Bild (PD) anzeigen kann;

eine Vielzahl von Informationsquellen (13, 15, 26) für die Anzeige als genanntes Hauptbild und als mindestens ein Bild-im-Bild;

manuell bedienbare Steuermittel (17, 37) zur Steuerung von mindestens einer Eigenschaft des Hauptbildes und zur Steuerung von mindestens einer Eigenschaft eines vorgegebenen Bildes-im-Bild;

Auswahlmittel (M/P) zum Auswählen, ob die genannten Steuermittel mindestens eine Eigenschaft des genannten Hauptbildes oder mindestens eine Eigenschaft des vorgegebenen Bildes-im-Bild in Reaktion auf die manuelle Bedienung steuern; und einen Angabemittel-Generator (35) zur Anzeige von Angabemitteln (39, 41) auf dem genannten Bildschirm, dadurch gekennzeichnet, das der Angabemittel-Generator (35) auf die genannten Auswahlmittel (M/P) reagiert und die genannten Anzeigemittel (33) dazu veranlaßt, auf dem genannten Bildschirm Angabemittel (39, 41) anzuzeigen, die angeben, welches der genannten Bilder bei manueller Bedienung durch die genannten Steuermittel (17, 37) gesteuert wird.

2. Fernsehsystem nach Anspruch 1, wobei das genannte Angabemittel ein Bild (39, 41) ist, das dem genannten vorgegebenen von dem mindestens einen Bild-im-Bild zugeordnet wird, wenn das Auswahlmittel (M/P) betätigt wird, um das genannte vorgegebene Bild zur Steuerung durch das genannte Steuermittel zu wählen.

3. Fernsehsystem nach Anspruch 1 oder 2, wobei das genannte Angabemittel ein Bild (39) ist, das dem genannten Hauptbild zugeordnet wird, wenn das genannte Auswahlmittel betätigt wird, um das genannte Hauptbild zur Steuerung durch das genannte Steuermittel zu wählen.

4. Fernsehsystem nach Anspruch 2 oder 3, wobei das genannte Angabemittel ein Rand (41) an mindestens einem Teil der Kante des genannten Bildes-im-Bild ist.

5. Fernsehsystem nach Anspruch 4, wobei sich der genannte Rand (41) an der oberen und an der linken Kante des genannten Bildes-im-Bild befindet.

6. Fernsehsystem nach Anspruch 1, wobei die genannten manuell bedienbaren Steuermittel (17, 37) angepaßt sind, um das genannte Hauptbild von einer der genannten Informationsquellen (13, 15, 26), das von diesem System wiedergegeben werden kann, auf eine andere solche Quelle umzuschalten, und um eines von dem mindestens einen Bild-im-Bild von einer der genannten Informationsquellen, das von diesem System wiedergegeben werden kann, auf eine andere solche Quelle umzuschalten;

wobei die genannten Auswahlmittel (M/P) angepaßt sind, um auszuwählen, ob das genannte Steuermittel das genannte Hauptbild oder das genannte vorbestimmte von dem mindestens einen Bild-im-Bild in Reaktion auf die manuelle Betätigung zwischen Informationsquellen umzuschaltet, und

wobei die genannten Angabemittel (39, 41) angeben, welches der genannten Bilder das genannte Steuermittel (17, 37) bei manueller Betätigung zum Auslösen einer solchen Umschaltung zwischen Signalquellen umschalten wird.

7. Fernsehsystem nach Anspruch 1, das außerdem erste Abstimmittel (13) zum Umschalten des genannten Hauptbildes von einem ersten Kanal auf einen beliebigen anderen einer Vielzahl von Kanälen enthält und zweite Abstimmittel (15) zum Umschalten des genannten Bildes-im-Bild von einem zweiten Kanal auf einen beliebigen anderen einer Vielzahl von Kanälen, wobei

die genannten manuell bedienbaren Steuermittel (17, 37) angepaßt sind, um entweder den ersten Abstimmitteln oder den zweiten Abstimmitteln das Umschalten von Kanälen zu er-

möglichen;

und wobei die genannten Auswahlmittel (M/P) angepaßt sind, um auszuwählen, welches der Abstimmittel (13, 15) die manuell bedienbaren Steuermittel aktivieren werden; und wobei die genannten Angabemittel (39, 41) angeben, welches der genannten Abstimmittel (13, 15) aktiviert ist.

Revendications

1. Système de télévision comportant un récepteur de télévision du type à image dans l'image, comprenant :

un moyen d'affichage (33) avec un écran susceptible d'afficher une image principale (MD) et au moins une image dans l'image (PD);

une pluralité de sources d'informations (13, 15, 26) pour affichage sous la forme de ladite image principale et de ladite au moins une image dans l'image;

un moyen de commande (17, 37) actionnable à la main pour commander au moins une particularité de ladite image principale et pour commander au moins une particularité d'une image dans l'image prédéterminée;

des moyens de sélection (M/P) pour choisir si ledit moyen de commande commandera ladite au moins une particularité de ladite image principale ou ladite au moins une particularité de ladite image dans l'image prédéterminée en réaction à un actionnement manuel, et

un générateur de moyens indicateurs (35) pour afficher des moyens indicateurs (39, 41) sur ledit écran,

caractérisé en ce que le générateur de moyens indicateurs (35) est sensible auxdits moyens de sélection (M/P) pour amener ledit moyen d'affichage (33) à afficher sur ledit écran des moyens indicateurs (39, 41) indiquant laquelle desdites images ledit moyen de commande (17, 37) commandera lors d'un actionnement manuel.

2. Système de télévision selon la revendication 1, dans lequel ledit moyen indicateur est une image (39, 41) associée à ladite image prédéterminée de ladite au moins une image dans l'image lorsque lesdits moyens de sélection (M/P) sont actionnés pour sélectionner ladite image prédéterminée qui doit être commandée par ledit moyen de commande.

3. Système de télévision selon la revendication 1 ou 2, dans lequel ledit moyen indicateur est une image (39) associée à ladite image principale lorsque lesdits moyens de sélection sont actionnés pour sélectionner ladite image principale à commander par ledit moyen de commande.

4. Système de télévision selon la revendication 2 ou 3, dans lequel ledit moyen indicateur est un encadrement (41) sur au moins une partie du bord de ladite image dans l'image.

5. Système de télévision selon la revendication 4, dans lequel ledit encadrement (41) se trouve sur le bord latéral gauche et le bord supérieur de ladite image dans l'image.

6. Système de télévision selon la revendication 1, dans lequel ledit moyen de commande manuel (17, 37) est à même de commuter ladite image principale provenant de l'une desdites sources d'informations (13, 15, 26) qu'il est à même d'afficher vers une autre telle source et de commuter l'image prédéterminée de ladite au moins une image dans l'image provenant de l'une desdites sources d'informations qu'il est à même d'afficher vers une autre telle source;

lesdits moyens de sélection (M/P) sont à même de choisir si ledit moyen de commande commute ladite image principale ou ladite image prédéterminée de ladite au moins une image dans l'image entre des sources d'informations en réaction à un actionnement manuel, et

ledit moyen indicateur (39, 41) indiquant laquelle desdites images le moyen de commande (17, 37) commutera entre les sources d'informations lors de l'actionnement manuel pour provoquer une telle commutation.

7. Système de télévision selon la revendication 1, comprenant, en outre, un premier moyen à tuner (13) pour commuter ladite image principale d'un premier canal vers n'importe quel autre canal d'une pluralité de canaux et un deuxième moyen à tuner (15) pour commuter ladite image dans l'image d'un deuxième canal vers n'importe quel autre canal d'une pluralité de canaux, dans lequel

ledit moyen de commande manuel (17, 37) est à même d'activer soit le premier moyen à tuner pour commuter des canaux, soit le deuxième moyen à tuner pour commuter des canaux;

lesdits moyens de sélection (M/P) sont à même de choisir celui des moyens à tuner (13, 15) que ledit moyen de commande manuel activera, et lesdits moyens indicateurs (39, 41) indiquent celui desdits moyens à tuner (13,15) qui est activé.