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(54) Abstract Title
Internet TV wherein a channel may be selected via a hyper-text link

(57) An Internet-TV (figure 1) and it's operating method for allowing a user to change channel whilst looking at TV channel information (e.g. a program guide) on a web-site. The internet-TV includes an internet part having a central processing unit (CPU) 15 for: outputting a channel change command and corresponding channel information (e.g. tuning frequency for the TV part), receiving current TV channel information (i.e. channel being viewed) and transmitting said current TV channel information to a web-server. The internet part further comprises memory means 14, 18 for storing the name of a broadcasting station and an actual channel number (i.e. that indicating frequency) such that, in a preferred embodiment, when clicking on a hyperlink at a web-site only the position in the memory need be transmitted to the local device; the actual channel number being looked up. The internet-TV further comprises a TV part having a controller 30 for changing the TV channel according to the channel change command and corresponding channel information from the CPU, and a remote control signal receiver 29 receiving a remote control signal and inputting the remote control signal to the controller. Also claimed is the provision of a user selectable screen configuration so that the TV and web screens may be viewed simultaneously (figure 9).

FIG. 2

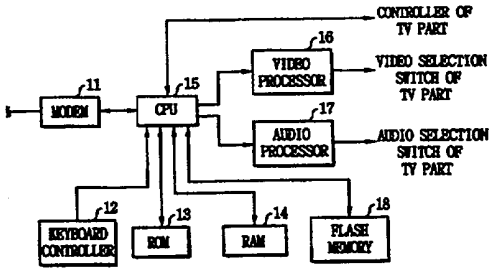

FIG. 3

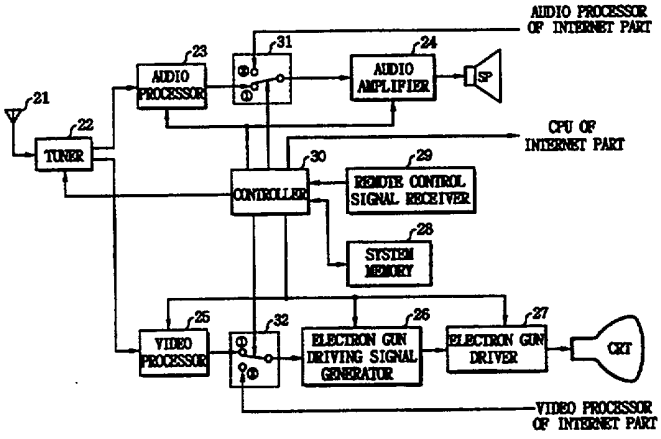

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FIG. 1

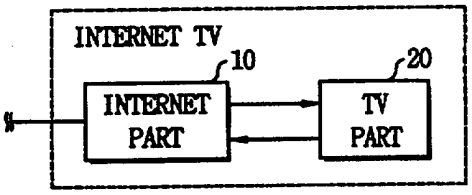

INTERNET TV
10
20
INTERNET PART
TV PART

FIG. 2

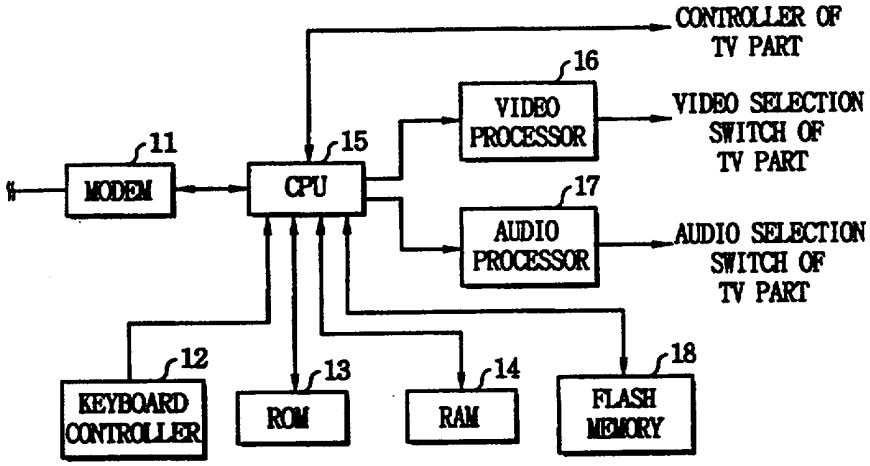

CONTROLLER OF TV PART
16
VIDEO PROCESSOR
VIDEO SELECTION SWITCH OF TV PART
11
15
MODEM
CPU
17
AUDIO PROCESSOR
AUDIO SELECTION SWITCH OF TV PART
12
13
14
18
KEYBOARD CONTROLLER
ROM
RAM
FLASH MEMORY

FIG. 3

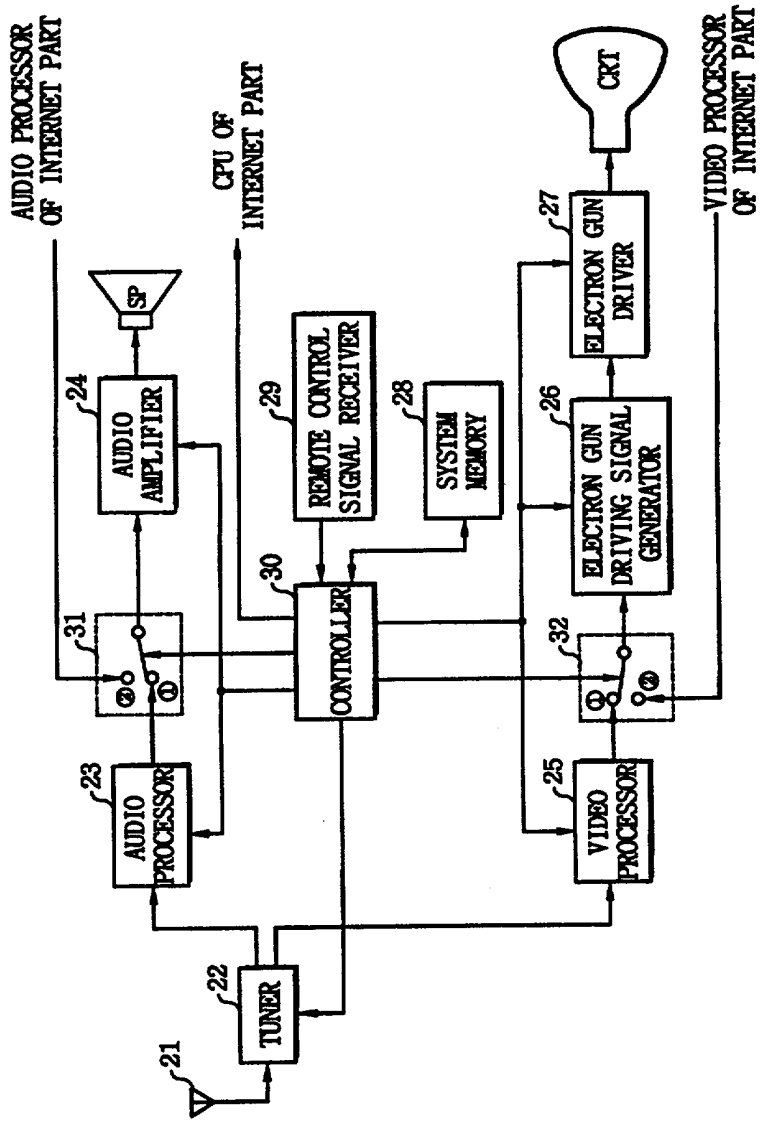

AUDIO PROCESSOR OF INTERNET PART
CPU OF INTERNET PART
VIDEO PROCESSOR OF INTERNET PART
SP
CRT
21
TUNER
22
AUDIO PROCESSOR
23
AUDIO AMPLIFIER
24
VIDEO PROCESSOR
25
ELECTRON GUN DRIVING SIGNAL GENERATOR
26
ELECTRON GUN DRIVER
27
SYSTEM MEMORY
28
REMOTE CONTROL SIGNAL RECEIVER
29
CONTROLLER
30
31
32

FIG. 4

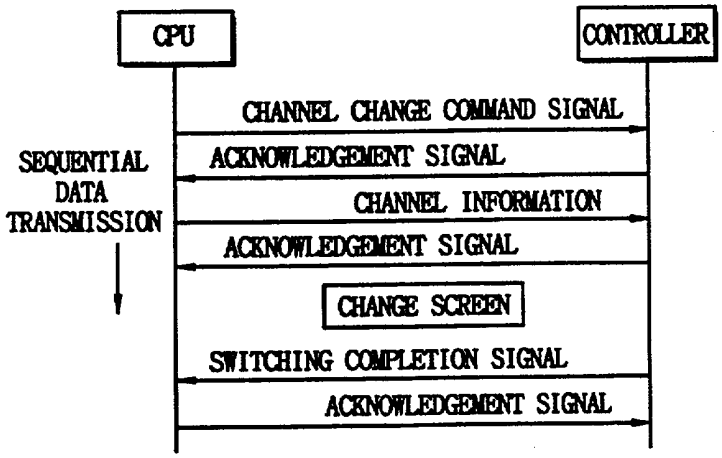

CPU
CONTROLLER
CHANNEL CHANGE COMMAND SIGNAL
SEQUENTIAL DATA TRANSMISSION
ACKNOWLEDGEMENT SIGNAL
CHANNEL INFORMATION
ACKNOWLEDGEMENT SIGNAL
CHANGE SCREEN
SWITCHING COMPLETION SIGNAL
ACKNOWLEDGEMENT SIGNAL

FIG. 6

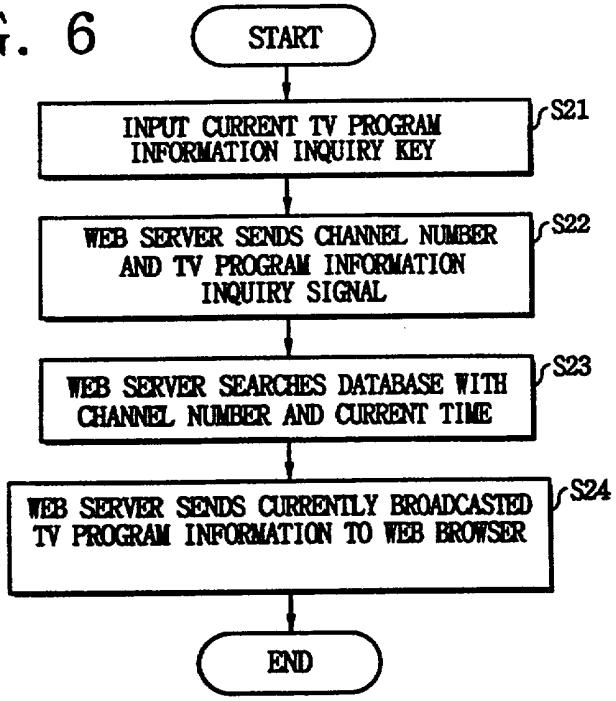

START
INPUT CURRENT TV PROGRAM INFORMATION INQUIRY KEY
S21
WEB SERVER SENDS CHANNEL NUMBER AND TV PROGRAM INFORMATION INQUIRY SIGNAL
S22
WEB SERVER SEARCHES DATABASE WITH CHANNEL NUMBER AND CURRENT TIME
S23
WEB SERVER SENDS CURRENTLY BROADCASTED TV PROGRAM INFORMATION TO WEB BROWSER
S24
END

FIG. 5

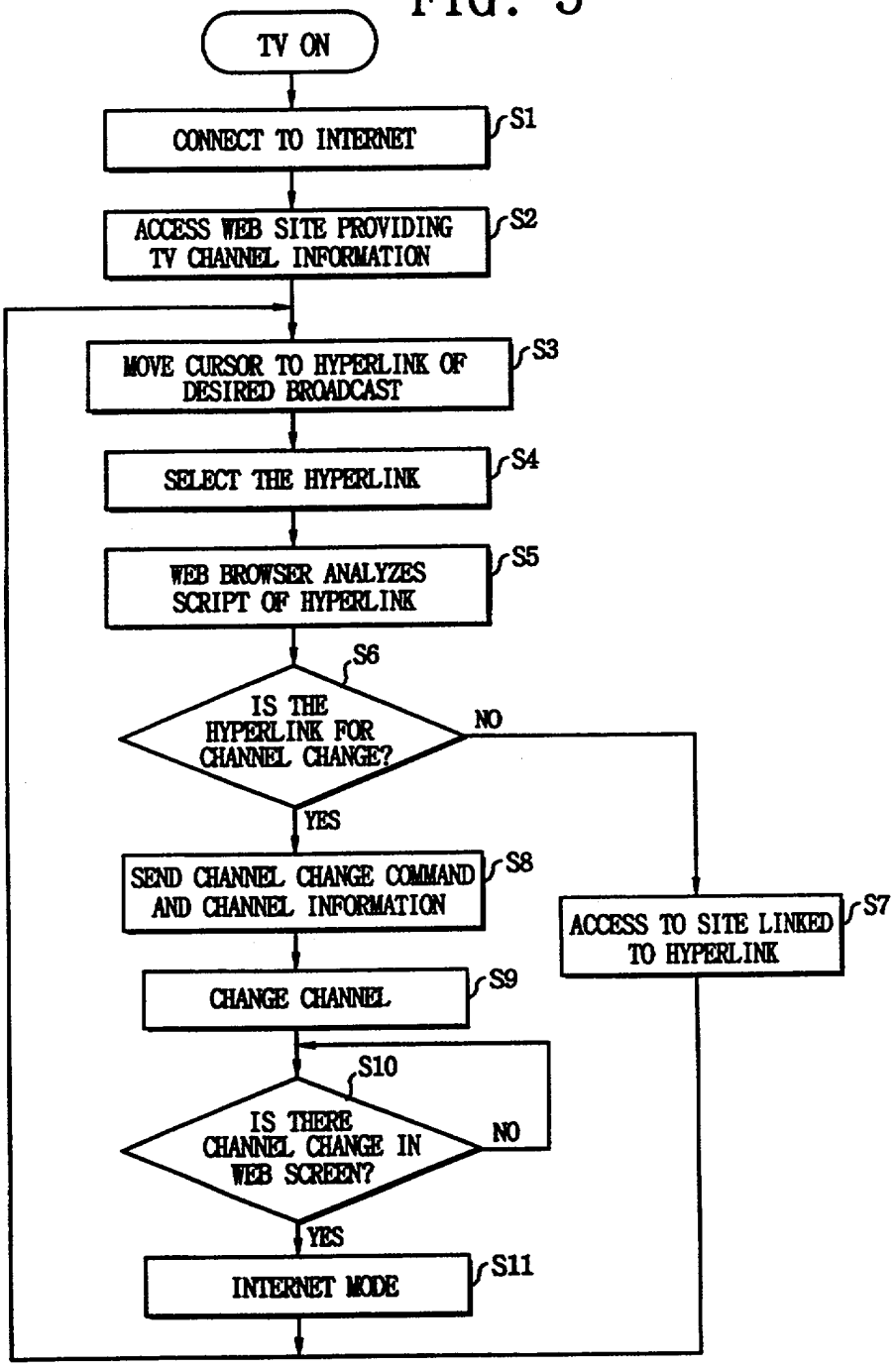

TV ON
CONNECT TO INTERNET
S1
ACCESS WEB SITE PROVIDING TV CHANNEL INFORMATION
S2
MOVE CURSOR TO HYPERLINK OF DESIRED BROADCAST
S3
SELECT THE HYPERLINK
S4
WEB BROWSER ANALYZES SCRIPT OF HYPERLINK
S5
S6
IS THE HYPERLINK FOR CHANNEL CHANGE?
NO
YES
SEND CHANNEL CHANGE COMMAND AND CHANNEL INFORMATION
S8
ACCESS TO SITE LINKED TO HYPERLINK
S7
CHANGE CHANNEL
S9
S10
IS THERE CHANNEL CHANGE IN WEB SCREEN?
NO
YES
INTERNET MODE
S11

FIG. 7

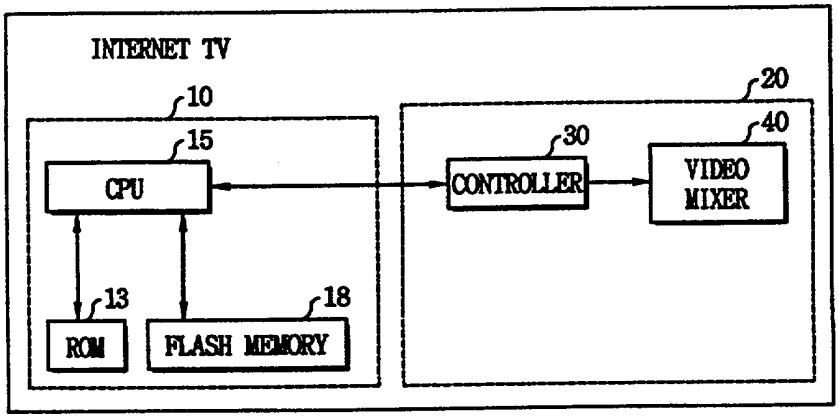

INTERNET TV
10
15
CPU
13
ROM
18
FLASH MEMORY
20
30
CONTROLLER
40
VIDEO MIXER

FIG. 9

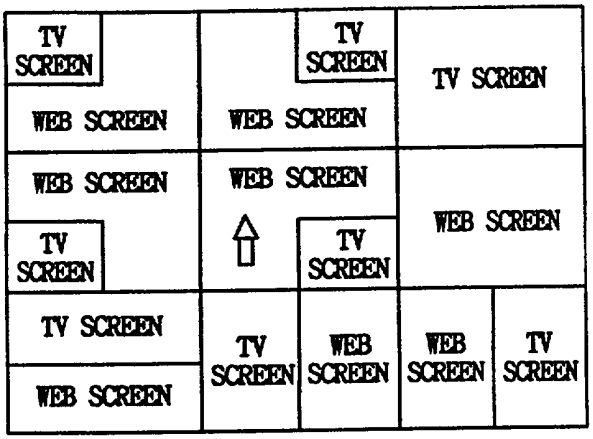

TV SCREEN
WEB SCREEN
TV SCREEN
WEB SCREEN
TV SCREEN
TV SCREEN
WEB SCREEN
WEB SCREEN
TV SCREEN
WEB SCREEN
TV SCREEN
TV SCREEN
WEB SCREEN
TV SCREEN
WEB SCREEN
WEB SCREEN
TV SCREEN

FIG. 8

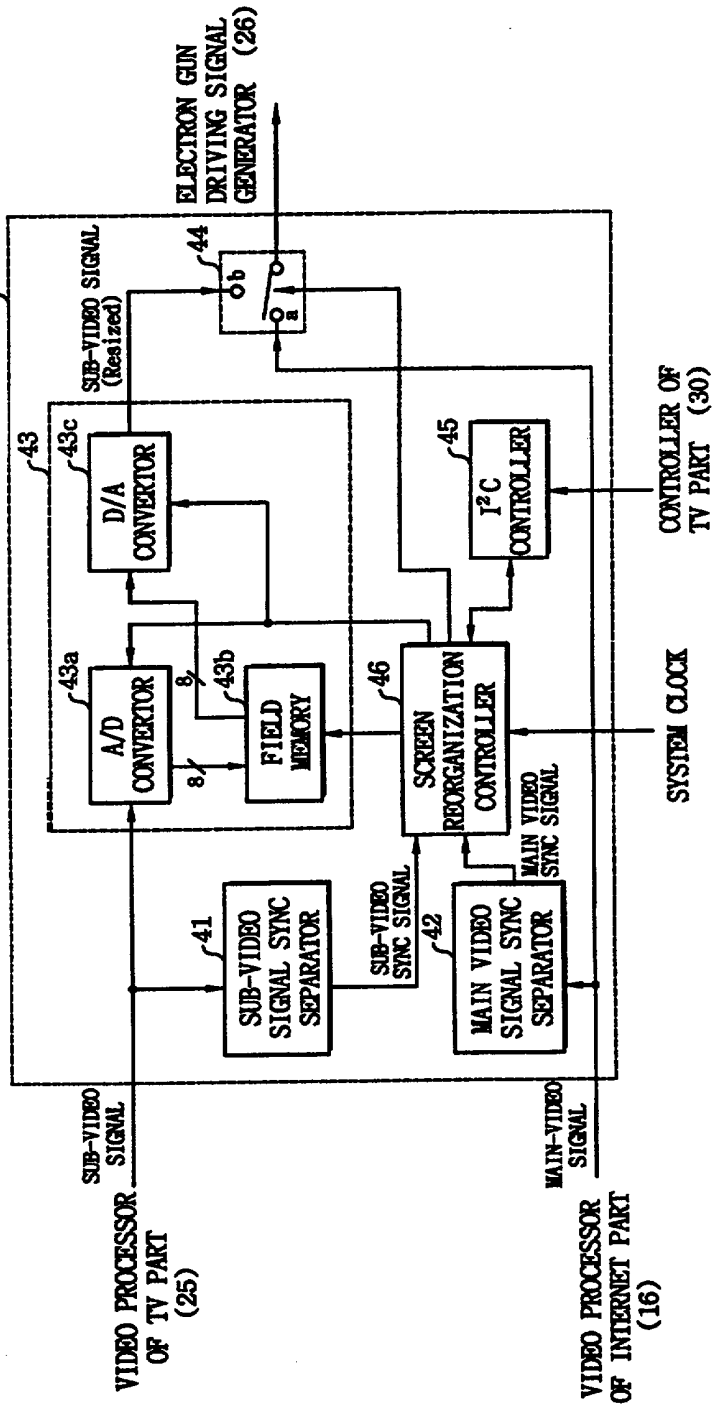

40
ELECTRON GUN DRIVING SIGNAL GENERATOR (26)
44
b
a
SUB-VIDEO SIGNAL (Resized)
43
43c
D/A CONVERTOR
45
I²C CONTROLLER
CONTROLLER OF TV PART (30)
43a
A/D CONVERTOR
8
43b
FIELD MEMORY
46
SCREEN REORGANIZATION CONTROLLER
SYSTEM CLOCK
MAIN VIDEO SYNC SIGNAL
41
SUB-VIDEO SIGNAL SYNC SEPARATOR
SUB-VIDEO SYNC SIGNAL
42
MAIN VIDEO SIGNAL SYNC SEPARATOR
SUB-VIDEO SIGNAL
VIDEO PROCESSOR OF TV PART (25)
MAIN-VIDEO SIGNAL
VIDEO PROCESSOR OF INTERNET PART (16)

FIG. 10

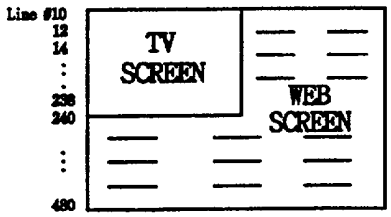


FIG. 11

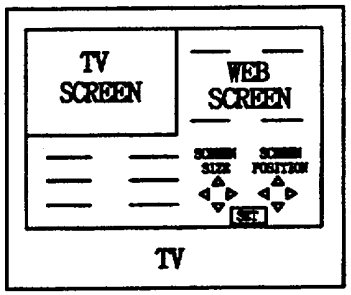


FIG. 13

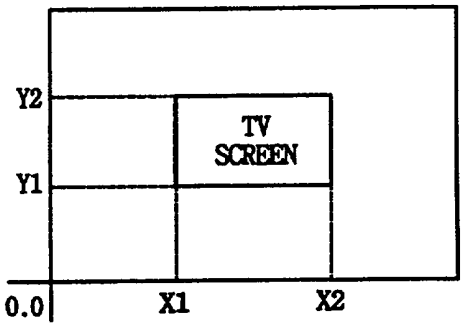
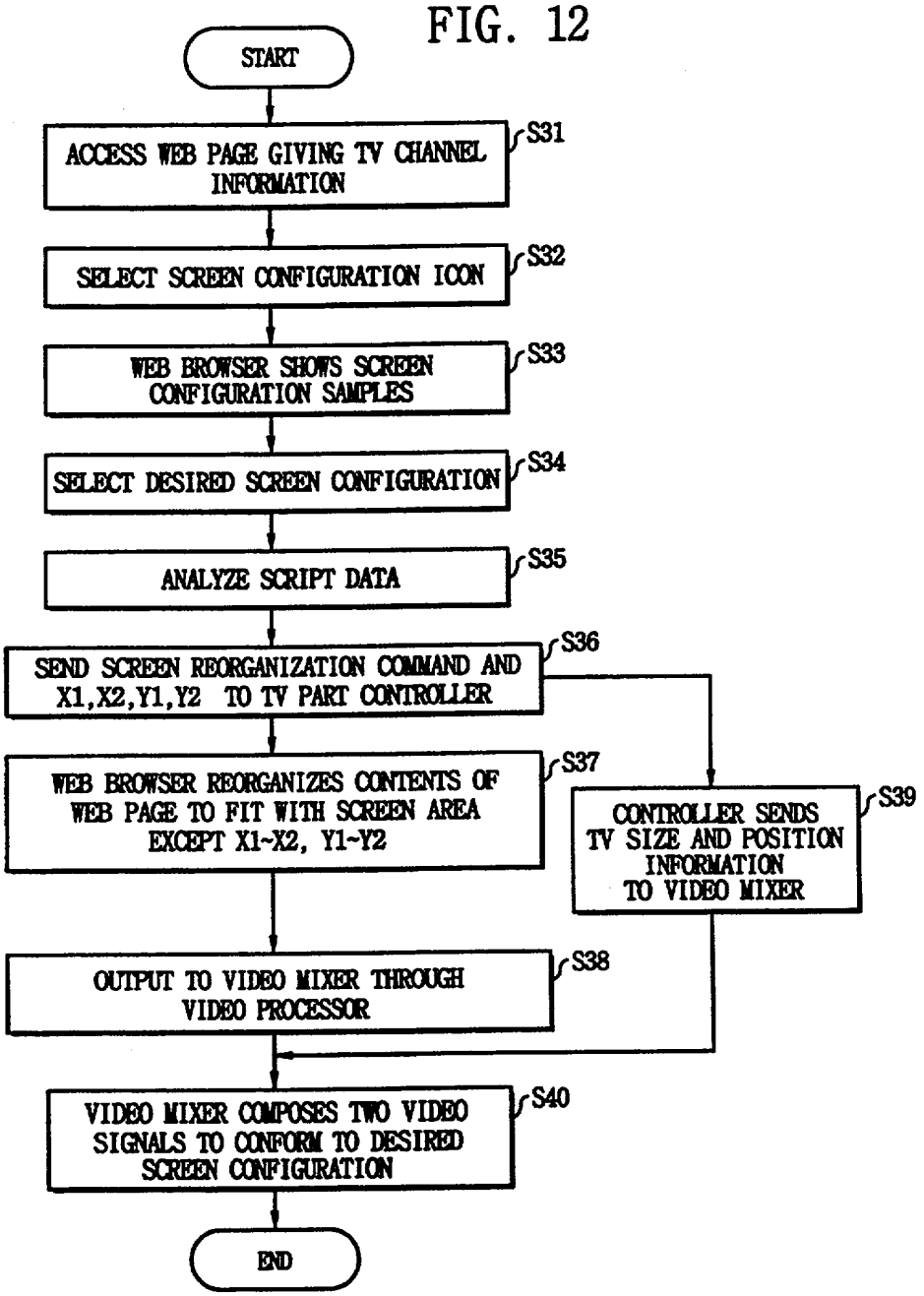


FIG. 12


START
ACCESS WEB PAGE GIVING TV CHANNEL INFORMATION
S31
SELECT SCREEN CONFIGURATION ICON
S32
WEB BROWSER SHOWS SCREEN CONFIGURATION SAMPLES
S33
SELECT DESIRED SCREEN CONFIGURATION
S34
ANALYZE SCRIPT DATA
S35
SEND SCREEN REORGANIZATION COMMAND AND X1,X2,Y1,Y2 TO TV PART CONTROLLER
S36
WEB BROWSER REORGANIZES CONTENTS OF WEB PAGE TO FIT WITH SCREEN AREA EXCEPT X1~X2, Y1~Y2
S37
CONTROLLER SENDS TV SIZE AND POSITION INFORMATION TO VIDEO MIXER
S39
OUTPUT TO VIDEO MIXER THROUGH VIDEO PROCESSOR
S38
VIDEO MIXER COMPOSES TWO VIDEO SIGNALS TO CONFORM TO DESIRED SCREEN CONFIGURATION
S40
END

INTERNET TV

BACKGROUND OF THE INVENTION

1. Technical field

The present invention relates to an Internet TV, and more particularly to apparatus and method for channel linking of an Internet TV for insuring easy movement to a desired TV channel.

The present invention also relates to an Internet TV in which screen size and position may be reorganized as desired when linking TV channel information provided by a Web site with an actual TV channel.

2. Description of the Prior Art

As the information technology is rapidly developed, the Internet becomes one of very useful communication means in a real life. For use of the Internet, a user usually accesses a server with use of an on-line access device.

Currently, most widely used on-line access device is a personal computer (PC) and other various devices for accessing the Internet without the PC are now under development, one of which is the Internet TV.

The Internet TV is a device combining a function of a general TV and a communication function of the PC, with which the user may

watch a TV program in a TV mode and use the Internet in an Internet mode.

Such Internet TV requests the user to push a corresponding button for changing from the TV mode to the Internet mode or from the Internet mode to the TV mode. When changing from the TV mode to the Internet mode for using the Internet function and then changing to the TV mode again, the Internet TV shows same broadcast channel as one, which is provided before changing to the Internet mode. Therefore, there is inconvenience that the user should input a corresponding key for watching another broadcast channel in the TV mode.

For example, in case that a user, who watched a MBC (Munwha Broadcasting Center in Korea) program, converts into the Internet mode for using the Internet and then converts again into the TV mode, the Internet TV shows the MBC program again to the user. If the user wants to see a KBS (Korea Broadcasting System in Korea) program during using the Internet, the user should push a key for changing the channel after converting into the TV mode.

In addition, the user should look for a newspaper or a magazine to find the broadcast program information, which is so inconvenient to the user.

Furthermore, though a general TV is commonly equipped with a PIP (Picture in Picture) function for displaying a sub-screen in a main

screen, the user may not see an area in the main screen overlapped by the sub-screen because the sub-screen occupies the area.

Therefore, there is a need for a screen reorganization technique, which improves the PIP function of the general TV, specially applied to the Internet TV. The screen reorganization technique is directed to the functions that the user may watch a Web screen and a TV screen at the same time without any loss of the screens and it is possible to adjust size and position of the screens.

SUMMARY OF THE INVENTION

The present invention is designed to overcome the above problems and inconveniences of the prior art. An object of the present invention is to provide an Internet TV and its operating method, which enables the user to easily change the TV channel during looking at the TV channel information in the Web site without any key input, which enables to organize the TV screen and the Web screen into a desired configuration such that the user may watch the TV screen and the Web screen in one screen, and which organizes the Web screen not to occupy the TV screen area such that the user may see contents of the Web site in the Web screen without any loss of the screen.

In order to accomplish the above object, the present invention provides an Internet TV including a TV part having a TV broadcast

signal reception function and an Internet part having an Internet communication function, wherein the Internet part comprises a central processor unit (CPU) for outputting a channel change command and corresponding channel information to the TV part when selecting a TV channel in a Web site providing TV channel information, receiving current TV channel information from the TV part and transmitting the current TV channel information to a Web server when required, and a storing means for storing a name of a broadcasting station and an actual channel number corresponding to a location of the broadcasting station by control of the CPU; and wherein the TV part comprises control means for changing the TV channel according to the channel change command and the corresponding channel information from the CPU, and remote control signal reception means for receiving a remote control signal and inputting the remote control signal in the control means.

In the above embodiment, when connecting to the Web server, the CPU may transmit equipment information used for connection to the Wen server.

In the above embodiment, when outputting the channel information to the TV part, the CPU may output an actual channel number corresponding to the location of the broadcasting station stored in the storing means.

The storing means preferably has a mapping table storing the name of the broadcasting station and the actual channel number corresponding to the location of the broadcasting station.

The control means may analyze the remote control signal inputted through the remote control signal reception means, and wherein, in case that the remote control signal is for the Internet part, the control means converts the remote control signal into a predetermined code and transmits to the CPU.

The CPU and the control means may transmit data in parallel through data buses and clock lines.

In the above embodiment, the CPU and the control means may transmit in series through data buses and clock lines.

In the above embodiment, the CPU may output a screen reorganization command and TV screen size and position information when a user selects a desired screen configuration among various screen configuration samples; the storing means may store the selected screen configuration, the TV screen size and position information and the latest selected TV channel information by control of the CPU; and the Internet TV may further comprise video mixer means for reorganizing the screen to the selected screen configuration according to the TV screen size and position information from the CPU.

In the above embodiment, the Internet TV may further comprise a

ROM (read-only memory) for storing a Web browser program for reorganizing a Web screen conforming to the selected screen configuration when the user selects the desired screen configuration among the various screen configuration samples.

The control means preferably receives the screen reorganization command and the TV screen size and position information from the CPU and provides the TV screen size and position information to the video mixer means.

The video mixer means may comprise sync separating means for separating a sync signal from a main video signal and a sub-video signal inputted; sub-screen reorganization means for reorganizing and outputting the sub-video signal to conform to a sub-screen size of the selected screen configuration; switching means for switching output of the sub-screen reorganizing means and the main video signal and outputting a composite video signal conforming to the selected screen configuration; and screen reorganization control means for controlling the sub-screen reorganization means and the switching means such that the screen is reorganized to conform to the selected screen configuration according to the outputs of the sync separating means and the control means.

The main video signal is preferably an video signal for the Web screen reorganized by the Web browser by control of the CPU when

selecting the screen configuration.

The sub-video reorganization means may comprise an A/D converter for A/D converting the sub-video signal by control of the screen reorganization means; a field memory for storing output of the A/D converter by control of the screen reorganization means; and a D/A converter for D/A converting output of the field memory to conform to a sub-screen of the selected screen configuration and outputting to the switching means by control of the screen reorganization means.

Preferably, size and position of the TV screen in the selected screen configuration are adjustable.

Also preferably, size and the position of the sub-screen are adjusted by using a screen size adjustment icon and a screen position adjustment icon.

A TV channel of the TV screen is preferably determined as a TV channel stored in the storing means when reorganizing the screen to conform to the selected screen configuration.

In order to obtain the above object, the present invention provides a method of operating an Internet TV comprising the steps of: automatically connecting to Internet when turning on the Internet TV; connecting to a Web server, which provides TV channel information, and selecting a hyperlink of a desired broadcast; analyzing a script of the selected hyperlink and determining whether the hyperlink is for

channel change or a general hyperlink; connecting to a linked part of the general hyperlink in case that the hyper link is the general hyperlink and outputting a control signal for channel change and corresponding channel information from a mapping table storing a name of a broadcasting station and an actual channel number according to a location of the broadcasting station in case that the hyperlink is for channel change; and changing a channel according to the corresponding channel information according to the control signal.

In the above embodiment, when connecting to the Web server, a Web browser of a user may transmit equipment information used for connection to the Web server.

The script of the hyperlink may include the channel information and information informing that the hyperlink is for channel change in case that the hyperlink is for channel change.

The method of operating an Internet TV may further comprise a TV program information inquiry step, which includes the steps of; converting into an Internet mode, connecting to the Web server providing the TV channel information and then transmitting the TV program information inquiry request signal and inquired channel information, when a user requests a TV program information inquiry for a channel; and receiving the channel information from the Web server and displaying the channel information on a screen.

The method of operating an Internet TV may further comprise the step of providing a Web screen and a TV screen in one screen, which includes the steps of: accessing the Web server providing the TV channel information and then selecting a desired screen configuration among various screen configuration samples provided from the Web server; analyzing script data of the selected screen configuration; outputting a video signal of the Web screen conforming to the Web screen configuration and a video signal of the TV screen conforming to the TV screen configuration as a result of the analysis; and composing the video signal of the Web screen and the video signal of the TV screen to configure both video signals into one screen.

The script data may include a screen reorganization command and TV screen size and position information.

The TV screen size and position information is preferably X-Y coordinates of the TV screen.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings, in which like components are referred to by like reference numerals. In the drawings:

FIG. 1 is a schematic diagram for showing an Internet TV of the present invention;

FIG. 2 is a detailed view for showing an Internet part in FIG. 1;

FIG. 3 is a detailed view for showing a TV part in FIG. 1;

FIG. 4 is for showing data flows between a CPU and a controller in the Internet TV of the present invention;

FIG. 5 is a flow chart for illustrating a channel change operation of the Internet TV according to the present invention;

FIG. 6 is a flow chart for illustrating operation of the Internet TV according to a current channel inquiry;

FIG. 7 is a block diagram for showing a screen reorganization device according to the present invention;

FIG. 8 is a detailed view of a video mixer in FIG. 7;

FIG. 9 is a view showing screen configuration samples of the present invention;

FIG. 10 is a view for illustrating a screen reorganization operation;

FIG. 11 is a view showing a screen size adjustment icon and a screen position adjustment icon of the present invention;

FIG. 12 is a flow chart for illustrating a screen reorganization process of the present invention; and

FIG. 13 is a view for illustrating size and position information of a

TV screen.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

FIG. 1 shows a basic concept of an Internet TV according to the present invention. Referring to the figure, an Internet part 10 for an Internet function and a TV part 20 for a TV function are bidirectionally connected in the Internet TV to transmit information to each other.

FIG. 2 shows a detail configuration of the Internet part 10 in FIG. 1.

As shown in the figure, the Internet part 10 includes a modem 11 having a modulation/demodulation function for receiving and transmitting relevant data for Web browsing in connection with the Internet, a keyboard controller 12, a ROM (Read Only Memory) 13 for storing a Web browser program and relevant various programs, a RAM (Random Access Memory) 14 for temporarily storing data required for the Web browser, a CPU (Central Processor Unit) 15 for executing the Web browser program, outputting a control signal corresponding to a command inputted from a keyboard or a remote controller through a controller 30 (described below) of the TV part 20 and exchanging data required for channel change with the controller 30 of the TV part 20,

video and audio processors 16, 17 for converting video and audio signals from the CPU 15 to have a format receivable in the TV part 20, and a flash memory 18 having a mapping table for storing a name of a broadcasting station and an actual channel information of the broadcasting station according to its location. All of the above components are connected to the CPU 15.

At this time, the modem 11 is only an example and various connecting devices such as a general modem, an ADSL (Asymmetric Digital Subscriber Line) modem, an ISDN (Integrated Services Digital Network) modem, etc. are possible.

FIG. 3 shows the TV part of FIG. 1 in detail. As shown in the figure, the TV part 20 includes a tuner 22 for tuning a broadcast signal received through an antenna 21 into a desired specific frequency and outputting a basic video signal and a basic audio signal, an audio processor 23 for processing the basic audio signal from the tuner 22 into an actual audio signal, an audio amplifier 24 for amplifying an output signal of the audio processor 23 and outputting a speaker (SP) driving signal, a video processor 25 and an electron gun driving signal generator 26 for converting the basic video signal from the tuner 22 into an electron gun driving signal, an electron gun driver 27 for driving an electron gun of a CRT (Cathode Ray Tube) according to the electron gun driving signal of the electron gun driving signal generator 26, a system

memory 28 and a remote control signal receiver 29 for receiving a remote control signal from a remote controller (not shown).

The TV part 20 also includes a controller 30 for controlling each of above components in the TV part 20 according to the remote control signal, transmitting data required for channel change with the CPU 15 of the Internet part 10 and controlling the channel change according to the data, an audio selection switch 31 connected between the audio processor 23 and the audio amplifier 24 for selecting one of the outputs from the audio processor 17, 23 of the Internet part 10 and the TV part 20 by control of the controller 30, and a video selection switch 32 connected between the video processor 25 and the electron gun driving signal generator 26 for selecting one of the outputs of the video processor 16, 25 of the Internet part 10 and the TV part 20 by control of the controller 30.

A bus available for the CPU 15 and the controller 30 may employ an existing data transmitting/receiving method such as I^2C or a serial communication method, and in another simple way, it is also possible to install 8 or 4 bit data bus and clock lines. The CPU 15 and the controller 30 may endow a required command with a peculiar code.

Moreover, though not shown in the figure, the remote controller or other key input units of the TV part 20 is provided with a plurality of keys for performance of various functions.

When the Internet TV of the present invention is in a TV mode, the audio selection switch 31 and the video selection switch 32 are switched into terminal ✂ respectively by control of the controller 30.

Therefore, the audio signal received through the antenna 21 and tuned in the tuner 22 is outputted to the speaker (SP) through the audio processor 23 – the terminal ✂ of the audio selection switch 31 – the audio amplifier 24, while the video signal is outputted to the CRT through the video processor 25 – the terminal ✂ of the video selection switch 32 – the electron gun driving signal generator 26 – the electron gun driver 27.

In an Internet mode, the audio selection switch 31 and the video selection switch 32 are switched into terminal ✁ by control of the controller 30.

Therefore, the Internet audio signal received through the modem 11 is outputted to the speaker (SP) through the CPU 15 – the audio processor 17 – the terminal ✁ of the audio selection switch 31 – the audio amplifier 24, while the Internet video signal is outputted to the CRT through the CPU 15 – the video processor 16 – the terminal ✁ of the video selection switch 32 – the electron gun driving signal generator 26 – the electron gun driver 27.

The Internet TV uses TV channel information provided from the Web server for channel change. When the Internet part 10 operates

Web browsing, the CPU 15 transmits to the Web server a control signal informing that a currently used connection equipment is the Internet TV such that the Web server may distinguish the user of the Internet TV from others using personal computers.

If the user, who is accessing the Web server in the Internet mode, accesses a site providing the TV channel information and then clicks a desired channel in the Web site for channel change with seeing the TV channel information, the Web browser makes the CPU 15 of the Internet part 10 send a TV channel change command signal and corresponding channel information to the controller 30 of the TV part 20.

At this time, the CPU 15 extracts an actual channel information of the user selected channel from the mapping table stored in the flash memory 18 and transmits the actual channel information to the controller 30.

The actual channel information is likely to depend on a location where a TV is installed. For example, the MBC is provided with the channel 11 in Seoul, which may be different in other locations.

Therefore, when the user wants to change a channel using information shown in the Web browser without using a button in the TV set or the remote controller, the TV channel information should include channel information according to the location.

In this reason, the Web server stores a name of a broadcasting station and actual channel information of the broadcasting station according to its location in the mapping table. The mapping table is stored in the flash memory 18 of the Internet part 10 from the Web server. The mapping table is also periodically updated.

According to the TV channel change command signal and the corresponding channel information, the controller 30 controls the tuner 22 to change the channel and switches the audio selection switch 31 and the video selection switch 32 into the terminal ✂, a TV mode switching state, which enables to change the channel without any key input.

At this time, the controller 30 sends current channel information to the CPU 15 in a predetermined period. The current channel information is required later for telling the user, who enters the Internet mode during watching the TV, the channel that the user was watching.

That is, because the controller 30 periodically sends the current channel information to the CPU 15, the Web browser may always know which TV channel is selected at that time, which enables to show to the user the channel information that the user was watching before entering the Internet mode, while the user is seeing an Internet screen.

When changing the channel, sequential data transmission between the CPU 15 of the Internet part 10 and the controller 30 of the

TV part 20 is shown in FIG. 4. Referring to the figure, after the CPU 15 sends the TV channel change command signal to the controller 30 of the TV part 20, the controller 30 of the TV part 20 sends an acknowledgement signal informing reception of the TV channel change command signal to the CPU 15 of the Internet part 10. The CPU 15 then sends the corresponding channel information to the controller 30 and then the controller 30 sends an acknowledgement signal informing the reception of the channel information to the CPU 15.

Then, after tuning operation of the tuner 22 and switching operations of the audio selection switch 31 and the video selection switch 32, the controller 30 sends a switching completion signal to the CPU 15 of the Internet part 10. The CPU 15 then sends an acknowledgement signal informing the reception of the switching completion signal to the controller 30.

The present invention is also configured that the controller 30 of the TV part 20 receives and analyzes the remote control signal and then sends the remote control signal to the CPU 15 of the Internet part 10.

In comparison with an alternative method that the CPU 15 of the Internet part 10 directly receives and analyzes the Internet-related remote control signal, the above data transmission method is more efficient because the controller 30 of the TV part 20 receives and analyzes all remote control signals, and the controller 30 converts the

remote control signal into a code defined between the controller 30 and the CPU 15 and sends the converted code if the remote control signal is an Internet-related signal, such that only the controller 30 of the TV part 20 analyzes the remote control signal, which was duplicately proceeded by the controller 30 of the TV part 20 and the CPU 15 of the Internet part 10 in a conventional manner.

The remote control signals may be signals generated by, for example, direction keys (5, 6, 3, 4), set keys, etc.

In addition, the present invention may give a TV program reserving function. If the user selects the reservation function in the Web screen, such information is sent and stored in the Web server.

If it is a time of starting a reserved TV program, the Web server transmits a channel change command and the name of the corresponding broadcasting station to the Web browser. The CPU 15 then searches the channel information corresponding to the broadcasting station name in the mapping table stored in the flash memory 18 and then sends the channel information to the controller 30 of the TV part 20.

At this time, the Web server notifies the start time of the reserved TV program with use of KBPS (Korea Broadcasting Programmable System) information or G code information.

The controller 30 then controls the tuner 22 such that the user

may watch the reserved program.

FIG. 5 is a flow chart for illustrating a channel change operation of the Internet TV according to the present invention.

As shown in the figure, in the channel change operation, if turning on the Internet TV and executing the Web browser, the Internet TV is automatically connected to the Internet S1. If the user accesses the Web site providing the TV channel information, the Web browser sends to the Web server a signal informing that an equipment connected to the Web server is the Internet TV S2.

Then, the user moves a cursor to a hyperlink of a desired broadcast with a common cursor moving method using a directional key of the remote controller or other pointing devices S3, and then selects the hyperlink S4. The Web browser analyzes a script of the selected hyperlink S5 and determines whether the hyperlink is for channel change S6.

If the hyperlink is a general hyperlink not for the channel change, the Web browser connects to a site linked to the hyperlink S7. If the hyperlink is for the channel change, the CPU 15 of the Internet part 10 extracts an actual channel information (a channel number) of the selected channel from the mapping table in the flash memory 18 and sends the actual channel information to the controller 30 together with the channel change command S8.

The controller 30 then controls the tuner 22 to change the channel according to the channel change command and switches the audio selection switch 31 and the video selection switch 32 into the terminal ✂ to output the broadcast signal of the corresponding channel S9.

The controller 30 also determines whether there is an input of a channel change key for changing to the Web site screen in the Internet mode S10. If there is an input of the screen change key toward the Web site screen, the controller 30 of the TV part 20 switches the audio selection switch 31 and the video selection switch 32 into the terminal ✂ for the Internet mode S11. After that, the process returns to the step S3.

FIG. 6 is a flow chart for illustrating an operation for inquiring the current channel information in the Internet TV according to the present invention.

The current channel inquiry is required for inquiring TV program information when changing from the TV mode to the Internet mode.

As shown in the figure, at first the user inputs a current TV program information inquiry key S21. Then, the Web browser sends the channel number and a TV program information inquiry signal to the Web server S22. Of course, the Web browser has already known the channel number of the currently watched TV program because the

controller 30 of the TV part 20 periodically sends the current TV channel information to the CPU 15 of the Internet part 10.

The Web server 22 receiving the TV program information inquiry signal then searches a database in the Web server by using the channel number and a current time S23. After searching, the Web server 22 sends the TV program information currently broadcasted in the channel to the Web browser S24.

Therefore, the user may refer to the currently broadcasted TV program information displayed in the screen in order to determine whether or not to watch the TV program.

This is useful when the user wants to change the channel during watching a TV program and also wants to know about TV program information currently broadcasted in other channels. That is, if the user watching a MBC program wants to change the channel for watching a KBS program, the user may inquire the TV program information currently broadcasted in the KBS channel in order to determine whether or not to watch the KBS program.

FIG. 7 is a block diagram for showing the Internet TV having a screen reorganization function according to another embodiment of the present invention. In the figure, components like FIGs. 1 to 3 are indicated by like reference numbers.

As shown in the figure, the Internet TV having the screen

reorganization function includes an Internet part 10 and a TV part 20, similar to the above embodiment shown in FIG. 1. The Internet part 10 includes a CPU 15 for outputting a screen reorganization command and TV screen size and position information to the controller 30 of the TV part 20 when a user selects a desired screen configuration among various screen configuration samples, a ROM 13 for storing a Web browser program for reorganizing a Web screen to conform to the selected screen configuration when the user selects the desired screen configuration, and a flash memory 18 for storing the selected screen configuration, the TV screen size and position information and the latest selected TV channel information by control of the CPU 15.

The TV part 20 includes a controller 30 for receiving the screen reorganization command and the TV screen size and position information from the CPU 15 and providing the TV screen size and position information to a video mixer 40, described below, and a video mixer 40 for reorganizing the screen to conform to the selected screen configuration according to the TV screen size and position information from the controller 30.

FIG. 8 is a detailed block diagram for showing the video mixer 40 in FIG. 7.

As shown in the figure, the video mixer 40 includes a sub-video signal sync separator 41 for receiving the output of the video processor

25 in FIG. 3 as a sub-video signal and separating a sync signal from the sub-video signal, a main video signal sync separator 42 for receiving the output of the video processor 16 in FIG. 2 as a main video signal and separating a sync signal from the main video signal, a sub-screen reorganizer for receiving the output of the video processor 25 as a sub-screen signal for sub-screen display and reorganizing and outputting the sub-screen signal to conform to the screen size and position information, a switching unit 44 for switching and outputting the output of the sub-screen reorganizer 43 and the output of the video processor 16 as a main video signal, an I^2C controller 45 for receiving a control signal in an I^2C bus format from the controller 30 of the TV part 20 and analyzing and outputting the command signal, a screen reorganization controller 46 for receiving the output of the I^2C controller 45 and the outputs of the main and sub-video sync separators 41, 42 to control the sub-screen reorganizer 43 and the switching unit 44.

The sub-screen reorganizer 43 includes an A/D converter 43a for A/D converting the inputted sub-screen video signal by control of the screen reorganization controller 46, a field memory 43b in which the output of the A/D converter 43a is stored by control of the screen reorganization controller 46, and a D/A converter 43c for D/A converting the output of the field memory 43b to conform to the sub-screen of the selected screen configuration by control of the screen

reorganization controller 46 and outputting the converted output to the switching unit 44.

In the present invention configured as above, screen configuration samples may be provided from the Web server as shown in FIG. 9. If a user moves a cursor and selects a desired screen configuration sample with use of directional keys in the remote controller, a display screen of the Internet TV is configured in accordance with the selected screen configuration sample.

That is, if the user selects one of the screen configuration samples in FIG. 9, the TV screen (sub-screen) size and position information according to the selected screen configuration sample is inputted in the CPU 15 of the Internet part 10 and then the CPU 15 drives the Web browser program stored in the ROM 13 in order to reorganize the Web screen to show information in a remaining portion of the display screen according to the TV screen size and position information.

Also, the CPU 15 transmits the screen reorganization command and the TV screen size and position information for the selected screen reorganization sample to the controller 30. The controller 30 then recognizes the screen reorganization command and then sends the TV screen size and position information from the CPU 15 to the I^2C controller 45 of the video mixer 40. The I^2C controller 45 then analyzes a control signal from the controller 30 and then sends the control signal

to the screen reorganization controller 46.

The video signal of the Web screen (main screen) reorganized by the Web browser according to the selected screen configuration sample is then inputted to the sync separator 42 through the video processor 16 for sync separation. Then, only separated sync signals are inputted to the screen reorganization controller 46 as well as the a terminal of the switching unit 44.

The sub-video signal, output of the video processor 25 of the TV part 20, is inputted to the sync separator 41 for sync separation and then only separated sync signals are inputted to the screen reorganization controller 46.

The screen reorganization controller 46 analyzes the control signal inputted from the controller 30 through the I^2C controller 45, receives the main video and sub-video sync signals from the main video and sub-video signal sync separators 41, 42, and controls the sub-screen reorganizer 43 and the switching unit 44 according to the sync signals such that the main video and the sub-video corresponding to the selected screen configuration sample may be displayed.

The screen reorganization controller 46 controls the sub-screen reorganizer 43 as follows.

At first, the screen reorganization controller 46 controls the A/D converter 43a to convert an inputted analog sub-video signal into a

digital signal, controls the field memory 43b to store and output the converted digital sub-screen signal, and then controls the D/A converter 43c to convert the output of the field memory 43b into an analog signal and output the converted analog signal to the b terminal of the switching unit 44.

FIG. 10 shows an example of the screen configuration samples in which the TV screen (sub-screen) has a 1/4 size of the whole screen and is positioned in an upper left portion of the screen. The following descriptions are based on one field (Even) in a NTSC (National Television Standards Committee) analog TV using the interlacing scanning. In this example, the D/A converter 43c should output a sub-video signal conforming to size of the sub-screen. Therefore, the screen reorganization unit 46 outputs video signals having 120 lines of total 240 lines vertically and 320 pixels (one for a pixel) of total 640 pixels horizontally among the sub-screen signals stored in the field memory 43b to the D/A converter 43c.

Therefore, the D/A converter 43c receives only the video signal for the TV screen in FIG. 10. The video signal for the TV screen is converted into an analog signal and then inputted to the b terminal of the switching unit 44. The video signal for the TV screen is outputted through the b terminal of the switching unit 44 when displaying the TV broadcast. However, the video signal for the TV screen is switched to

the a terminal of the switching unit 44.

Therefore, the output of the switching unit 44 is composed with the video signal of the Web screen and the video signal of the TV screen to conform to the selected screen configuration and then outputted.

At this time, instead of such method of reorganizing the Web screen to show information in a screen area except the TV screen according to the TV screen size and position information set by the user, the Web browser may send the TV screen size and position information to the Web server and receive a page reorganized by the Web server to display the page.

In addition, if reorganization of the screen is completed, screen size control keys (up, down, right, left) and screen position control keys (up, down, right, left) may be provided at a corner of the screen as shown in FIG. 11 in order to adjust size and position of the TV screen.

That is, if the user adjusts the TV screen size or position with use of the screen size control keys or the screen position control keys, a corresponding command signal is sent to the CPU 15 of the Internet part 10. Then, the command signal is inputted to the controller 30 of the TV part 20 and then to the screen reorganization controller 45 through the I^2C controller 45 such that the sub-screen reorganizer 43 and the switching unit 44 may control the size and position of the TV screen.

At this time, according to the size and position control of the TV screen, the Web screen is also reorganized by the Web browser. Therefore, whole screen becomes reorganized by inputting the video signal conforming to the reorganized Web screen into the switching unit 44.

If the screen is reorganized according to the selected screen configuration, the TV channel is changed into the latest TV channel and corresponding TV channel information is stored in the flash memory 18 of the Internet part 10.

The CPU 15 controls to store the screen configuration and the TV screen size and position information in the flash memory 18 whenever the screen configuration or the TV screen size and position information changes such that the CPU 15 may remember the screen configuration just before turning off the Internet TV. When turning on the Internet TV, the screen configuration stored just before turning off the Internet TV is displayed.

Though not mentioned about the audio signal, in fact that the present invention displays the TV screen in form of the sub-screen, the audio signal is switched to the terminal ✂ of the audio selection switch 31 of FIG. 3 by control of the controller 30 in order to select and output an audio signal conforming to the TV screen.

In addition, when selecting a TV channel in the Web screen, the

present invention may apply the selected TV channel to the sub-screen. Change of the channel is already described above.

FIG. 12 shows a flow chart for illustrating the screen reorganization operation when changing the TV channel in the Web screen.

Referring to the figure, the user accesses the Web page giving the TV channel information S31 and then selects a screen configuration icon S32. Then the Web browser shows the screen configuration samples as shown in FIG. 9 S33. At this time, each screen configuration sample includes the screen reorganization command and the TV screen size and position information for each screen configuration in the script data.

When selecting a screen configuration shown in FIG. 13, the TV screen size and position information is X1, X2, Y1 and Y2, which are X-Y coordinates.

If selecting one screen configuration among the screen configuration samples S34, the CPU 15 analyzes the script data S35 and then sends the screen reorganization command and the TV screen size and position information (X1, X2, Y1, Y2) to the controller 30 of the TV part 30, S36.

The Web browser reorganizes contents in the Web page to fit with the screen area except X1-X2, Y1-Y2 area S37 and then outputs the

reorganized contents to the video mixer 40 through the video processor 16 S38. The controller 30 recognizes the screen reorganization command and then sends the TV screen size and position information to the video mixer 40, S39.

Through the operations of the steps S38, S39, the video mixer 40 composes the video signal for the Web screen and the video signal for the TV screen and then outputs the screen configuration desired by the user S40. Such steps S37, S38 and S39 are executed at the same time.

As described above, the present invention gives convenience to the user watching TV by connecting the TV with the Web because the user may easily change the TV channel during looking at the TV channel information in the Web site, in fact that watching TV and Web browsing are performed separately in the conventional art.

In addition, because inquiry about a desired broadcast program is possible, the present invention helps the user to select a program.

Furthermore, in the Internet TV of the present invention which may change the TV channel in the Web page, the TV screen and the Web screen may be seen in one screen and organized into a desired configuration and the Web screen is organized not to occupy the TV screen area such that the user may see contents of the Web site in the Web screen without any loss of the screen.

The Internet TV according to the present invention has been

described in detail. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

CLAIMS:

1. An Internet TV including a TV part having a TV broadcast signal reception function and an Internet part having an Internet communication function,

wherein the Internet part comprises a central processor unit (CPU) for outputting a channel change command and corresponding channel information to the TV part when selecting a TV channel in a Web site providing TV channel information, receiving current TV channel information from the TV part and transmitting the current TV channel information to a Web server when required, and a storing means for storing a name of a broadcasting station and an actual channel number corresponding to a location of the broadcasting station by control of the CPU; and

wherein the TV part comprises control means for changing the TV channel according to the channel change command and the corresponding channel information from the CPU, and remote control signal reception means for receiving a remote control signal and inputting the remote control signal in the control means.

2. The Internet TV as claimed in claim 1,

wherein, when connecting to the Web server, the CPU transmits

equipment information used for connection to the Wen server.

3. The Internet TV as claimed in claim 1,

wherein, when outputting the channel information to the TV part, the CPU outputs an actual channel number corresponding to the location of the broadcasting station stored in the storing means.

4. The Internet TV as claimed in claim 1,

wherein the storing means has a mapping table storing the name of the broadcasting station and the actual channel number corresponding to the location of the broadcasting station.

5. The Internet TV as claimed in claim 1,

wherein the control means analyzes the remote control signal inputted through the remote control signal reception means, and wherein, in case that the remote control signal is for the Internet part, the control means converts the remote control signal into a predetermined code and transmits to the CPU.

6. The Internet TV as claimed in claim 1,

wherein the CPU and the control means transmit data in parallel through data buses and clock lines.

7. The Internet TV as claimed in claim 1,

wherein the CPU and the control means transmit in series through data buses and clock lines.

8. The Internet TV as claimed in claim 1,

wherein the CPU outputs a screen reorganization command and TV screen size and position information when a user selects a desired screen configuration among various screen configuration samples;

wherein the storing means stores the selected screen configuration, the TV screen size and position information and the latest selected TV channel information by control of the CPU; and

wherein the Internet TV further comprises video mixer means for reorganizing the screen to the selected screen configuration according to the TV screen size and position information from the CPU.

9. The Internet TV as claimed in claim 8, further comprising a ROM (read-only memory) for storing a Web browser program for reorganizing a Web screen conforming to the selected screen configuration when the user selects the desired screen configuration among the various screen configuration samples.

10. The Internet TV as claimed in claim 9,

wherein the control means receives the screen reorganization command and the TV screen size and position information from the CPU and provides the TV screen size and position information to the video mixer means.

11. The Internet TV as claimed in claim 9, wherein the video mixer means comprises:

sync separating means for separating a sync signal from a main video signal and a sub-video signal inputted;

sub-screen reorganization means for reorganizing and outputting the sub-video signal to conform to a sub-screen size of the selected screen configuration;

switching means for switching output of the sub-screen reorganizing means and the main video signal and outputting a composite video signal conforming to the selected screen configuration; and

screen reorganization control means for controlling the sub-screen reorganization means and the switching means such that the screen is reorganized to conform to the selected screen configuration according to the outputs of the sync separating means and the control means.

12. The Internet TV as claimed in claim 11,

wherein the main video signal is an video signal for the Web screen reorganized by the Web browser by control of the CPU when selecting the screen configuration.

13. The Internet TV as claimed in claim 11, wherein the sub-video reorganization means comprises:

an A/D converter for A/D converting the sub-video signal by control of the screen reorganization means;

a field memory for storing output of the A/D converter by control of the screen reorganization means; and

a D/A converter for D/A converting output of the field memory to conform to a sub-screen of the selected screen configuration and outputting to the switching means by control of the screen reorganization means.

14. The Internet TV as claimed in claim 8,

wherein size and position of the TV screen in the selected screen configuration are adjustable.

15. The Internet TV as claimed in claim 14,

wherein the size and the position of the sub-screen are adjusted by using a screen size adjustment icon and a screen position adjustment icon.

16. The Internet TV as claimed in claim 8,

wherein, a TV channel of the sub-screen is determined as a TV channel stored in the storing means when reorganizing the screen to conform to the selected screen configuration.

17. A method of operating an Internet TV comprising the steps of:

automatically connecting to Internet when turning on the Internet TV;

connecting to a Web server, which provides TV channel information, and selecting a hyperlink of a desired broadcast;

analyzing a script of the selected hyperlink and determining whether the hyperlink is for channel change or a general hyperlink;

connecting to a linked part of the general hyperlink in case that the hyper link is the general hyperlink and outputting a control signal for channel change and corresponding channel information from a mapping table storing a name of a broadcasting station and an actual channel number according to a location of the broadcasting station in

case that the hyperlink is for channel change; and

changing a channel according to the corresponding channel information according to the control signal.

18. The method of operating an Internet TV as claimed in claim 17,

wherein, when connecting to the Web server, a Web browser of a user transmits equipment information used for connection to the Web server.

19. The method of operating an Internet TV as claimed in claim 17,

wherein the script of the hyperlink includes the channel information and information informing that the hyperlink is for channel change in case that the hyperlink is for channel change.

20. The method of operating an Internet TV as claimed in claim 17, further comprising a TV program information inquiry step, which includes the steps of;

converting into an Internet mode, connecting to the Web server providing the TV channel information and then transmitting the TV program information inquiry request signal and inquired channel

information, when a user requests a TV program information inquiry for a channel; and

receiving the channel information from the Web server and displaying the channel information on a screen.

21. The method of operating an Internet TV as claimed in claim 17, further comprising the step of providing a Web screen and a TV screen in one screen, which includes the steps of:

accessing the Web server providing the TV channel information and then selecting a desired screen configuration among various screen configuration samples provided from the Web server;

analyzing script data of the selected screen configuration;

outputting a video signal of the Web screen conforming to the Web screen configuration and a video signal of the TV screen conforming to the TV screen configuration as a result of the analysis; and

composing the video signal of the Web screen and the video signal of the TV screen to configure both video signals into one screen.

22. The method of operating an Internet TV as claimed in claim 21,

wherein the script data includes a screen reorganization

command and TV screen size and position information.

23. The method of operating an Internet TV as claimed in claim 22,

wherein the TV screen size and position information is X-Y coordinates of the sub-screen.

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Application No:	GB 0018785.6	**Examiner:**	Paul Jefferies
Claims searched:	1-23	**Date of search:**	6 December 2000

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H3Q (QCD, QLCX);

Int Cl (Ed.7): H04N 5/445,

Other: ONLINE: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 98/17064 A1 (GEMSTAR) See page 11, line 33 et seq. and figure 9.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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