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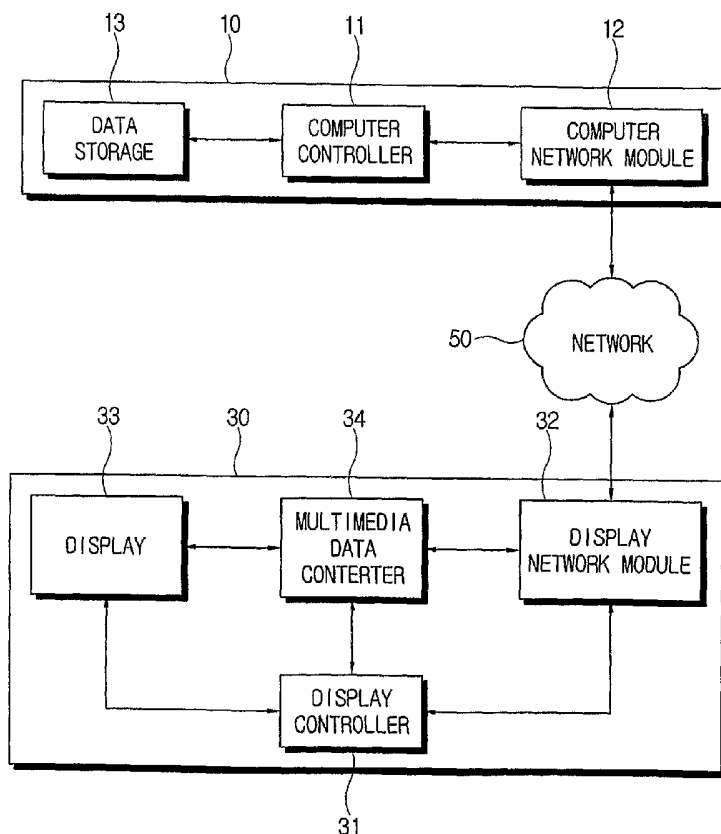
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[Continued on next page]

(54) Title: DISPLAY APPARATUS AND DISPLAY SYSTEM USING THE SAME



(57) Abstract: A display system having a computer including a computer network module accessing to a network for data communication, a data storage to store multimedia data and a computer controller to transmit the multimedia data stored in the data storage through the computer network module; and a display apparatus including a display to display an image thereon, a display network module connected to the computer network module through the network and to receive the multimedia data, a multimedia data converter to convert the multimedia data into a video signal to be processed by the display, and a display controller to control the display to display the image using the video signal converted by the multimedia data converter. With this configuration, a display apparatus and a display system using the same to connect a plurality of display apparatus using a network is provided.



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DISPLAY APPARATUS AND DISPLAY SYSTEM USING THE SAME

FIELD OF THE INVENTION

The present general inventive concept relates to a
5 display apparatus and a display system using the same,
and more particularly, to a display apparatus and a
display system using the same to connect a single
computer with a plurality of display apparatuses using a
network.

10 BACKGROUND ART

Generally, a display apparatus such as a liquid
crystal display (LCD) and a plasma display panel (PDP),
etc., is applied to various applications, for example a
television or a computer monitor, to display an image
15 thereon.

A monitor and a computer are connected each other
through a D-Sub connector or a digital visual interface
(DVI) connector to transmit a video signal from the
computer to the monitor therethrough. Further, the
20 monitor separately comprises an S-Video connector, which
is a component connector or a composite connector to
receive the video signal from an external device such as
a DVD player or a VCR.

The computer used to support only one output
25 connector tends to support more than two output

connectors such as the D-Sub connector, the DVI connector or the S-video connector. Accordingly, more than two monitors can be connected to one computer.

Meanwhile, the computer and the monitor become able
5 to transmit and receive not only the video signal but also data. For instance, the monitor transmits all relevant information about itself to the computer through a VESA (Video Electronics Standard Association) data display channel (DDC) communication line, and the
10 computer regularly transmits a control signal to the monitor through the DDC communication line.

However, a conventional computer has a limited number of output connectors allowed to be installed thereto due to a limited space of the computer, and the
15 limited number of output connectors allows only a corresponding number of monitors to be connected thereto.

Accordingly, a multi-connector is used to extend a cable to connect a plurality of connectors to access a plurality of monitors or display the same image on the
20 plurality of monitors respectively connected to one computer through the plurality of connectors.

However, if the plurality of monitors is connected using this method, the extended cable needs to be arranged neatly and causes a loss of video signals or
25 deterioration of a picture quality due to noise.

DISCLOSURE OF INVENTION

Accordingly, the present general inventive concept provides a display apparatus and a display system using the same to connect a single computer with a plurality of
5 display apparatuses using a network.

In addition, the computer transmits a control signal to control an operational state of the display apparatus through the network, and accordingly, the computer directly controls the display apparatus through the
10 network.

Additional aspects and advantages of the present general inventive concept will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by
15 practice of the general inventive concept.

The foregoing and/or other aspects and advantages of the present general inventive concept are achieved by providing a display system comprising a computer comprising a computer network module to access a network
20 for data communication, a data storage to store multimedia data and a computer controller to transmit the multimedia data stored in the data storage through the computer network module; and a display apparatus comprising a display to display an image thereon, a
25 display network module connected to the computer network

module through the network and to receive the multimedia data, a multimedia data converter to convert the multimedia data into a video signal to be processed by the display, and a display controller to control the
5 display to display the image using the video signal.

The display apparatus can further comprise an audio output part to output sound, and the multimedia data converter comprises a data sorting part to sort the multimedia data into video data and audio data; a video
10 converter to convert the video data into the video signal; and an audio converter to convert the audio data into an audio signal to be outputted through the audio output part.

The computer controller may transmit a control
15 signal to the display apparatus through the computer network module to control an operational state of the display apparatus, and the display controller controls a displaying state of the image displayed on the display and/or a volume level of the sound outputted to the audio
20 output part on the basis of the control signal transmitted through the display network module.

The computer controller can detect a data type of the multimedia data, and transmits a corresponding control signal based on the detected data type of the
25 multimedia data.

The computer controller can detect the data type of the multimedia data by a file extension of the multimedia data.

The display apparatus may further comprise a memory
5 to store information about the operational state of the display apparatus, the display controller transmits the information about the operational state stored in the memory to the computer through the display network module, and the computer controller outputs the control signal
10 based on the information about the operational state transmitted through the computer display network module.

The information about the operational state may comprise at least one of a current displaying state of the image displayed on the display and a current volume
15 level of the audio output part.

The foregoing and/or other aspects and advantages of the present general inventive concept are achieved by providing a display apparatus comprising a display to display an image thereon; a display network module to
20 access a network and to transmit/receive data; a multimedia data converter to convert received multimedia data into a video signal to be processed by the display; and a display controller to control the display to display the image using the video signal converted by the
25 multimedia data converter.

The display controller can detect a given control signal in the data transmitted through the display network module, and controls a displaying state of the image displayed on the display according to the detected control signal.

The display apparatus can further comprise an audio output part to output a sound, and the multimedia data converter comprising a data sorting part to sort the multimedia data into video data and audio data; a video converter to convert the video data into the video signal; an audio converter to convert the audio data into an audio signal to be output through the audio output part.

The display controller can detect a given control signal in the data transmitted through the display network module, and controls a volume level of the sound outputted to the audio output part according to the detected control signal.

The foregoing and/or other aspects and advantages of the present general inventive concept are achieved by providing a display system comprising a computer comprising a network communication part to communicate data to and from a network,

a storage unit to store multimedia data, and a controller unit to transmit the stored multimedia

data through the network communication part; and

a display apparatus comprising:

a display unit to display an image,

a display network module to receive the multimedia
5 data from the network communication part, and

a display controller to control conversion of the
multimedia data into a video signal and to control the
displaying of the image by the display unit using the
converted video signal.

10 The display controller may control conversion of the
multimedia data into video data to be outputted through
the display unit and audio data to be outputted as sound.

The display apparatus further comprises an audio
output part to output the audio data as sound.

15 The controller unit may transmit a control signal to
each of the display apparatus through the network
communication part to control an operational state of
each display apparatus, and the respective display
controller controls a displaying state of the image
20 displayed on the respective display unit and/or a volume
level of the sound outputted to the respective audio
output part on the basis of the control signal
transmitted through the display network module.

The controller unit can detect a data type of the
25 multimedia data, and transmits a corresponding control

signal based on the detected data type of the multimedia data.

The display apparatus may further comprise a memory to store information about the operational state of the display apparatus, and the display controller transmits the information about the operational state stored in the memory to the computer through the display network module, and the controller unit outputs the control signal based on the information about the operational state transmitted through the display network module.

The foregoing and/or other aspects and advantages of the present general inventive concept are achieved by providing a method of displaying multimedia data on a display apparatus using a network, the method comprising transmitting the multimedia data from a central location through a network; and receiving the multimedia data at the display apparatus, converting the multimedia data into a video signal to be processed by each of the display apparatus, and controlling the display of an image at each of the display apparatus using the converted video signal.

The converting of the multimedia data may comprise sorting the multimedia data into video data and audio data; converting the video data into the video signal to be displayed; and converting the audio data into an audio

signal to be output as sound.

The method may further comprise transmitting a control signal to each of the display apparatus through the network from the central location, to control an operational state of each of the display apparatus, controlling the displaying state of the image displayed on each of the display apparatus and/or a volume level of the sound outputted on the basis of the control signal transmitted through the network.

10 The operation of transmitting a control signal may comprise detecting a data type of the multimedia data, and transmitting a corresponding control signal based on the detected data type of the multimedia data.

The control signal transmitted may be based on 15 information received through the network about an operational state of the display apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and/or other aspects and advantages of the present general inventive concept will become apparent and more readily appreciated from the following 20 description of the embodiments, taken in conjunction with the accompany drawings of which:

FIG. 1 is a control block diagram illustrating a configuration of a display system according to an 25 embodiment of the present general inventive concept;

FIG. 2 is a control block diagram of a display system according to an embodiment of the present general inventive concept;

FIG. 3 is a control block diagram of a display apparatus according to another embodiment of the present
5 general inventive concept; and

FIG. 4 is a control block diagram of a computer according to another embodiment of the present general inventive concept.

10 MODES FOR CARRYING OUT THE INVENTION

Reference will now be made in detail to the embodiments of the present general inventive concept, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like
15 elements throughout.

As shown in FIGS. 1 and 2, a display system according to an embodiment of the present general inventive concept comprises a computer 10 connected to a network 50, and at least one display apparatus 30
20 connected to the computer 10 through the network 50.

The computer 10 according to FIGS. 1 and 2 transmits multimedia data to the display apparatus 30 through the network 50. The display apparatus 30 receives the multimedia data transmitted through the network 50 to
25 output an image or sound.

Herein, the computer 10 and the display apparatus 30 can communicate with each other through the network 50 such as a local area network (LAN), and transmits/receives data between each other using a standard communication protocol.

Referring to FIG. 2, the computer 10 comprises a computer network module 12 to access the network 50 to perform data communication; a data storage 13 to store the multimedia data; and a computer controller 11 to transmit the multimedia data stored in the storage 13 through the network module 12. Herein, the multimedia data may include various playback data, such as a moving picture file, an image file or a music file.

The display apparatus 30 comprises a display 33 to display an image thereon, a display network module 32, a multimedia data converter 34 and a display controller 31.

The display network module 32 transmits/receives data using the same standard communication protocol applied to the computer network module 12 of the computer 10, and receives the multimedia data transmitted from the computer 10 through the network 50. Herein, the display network module 32 transmits/receives the data using a TCP/IP communication protocol, and has its own IP address. Thus, the computer 10 can transmit the multimedia data to the IP address of the display apparatus 30 connected to

the network 50.

The multimedia data converter 34 converts the multimedia data transmitted through the display network module 32 into a video signal, so that the display 33 can process the video signal. Herein, the display controller 31 controls the display 33 to display an image using the video signal converted by the multimedia data converter 34.

A display apparatus 30 according to an embodiment of the present general inventive concept will be described hereinafter, while referring to FIG. 3. As previously described, the display apparatus 30 comprises the display 33, the multimedia data converter 34, the display network module 32, and the display controller 31. Additionally, the display apparatus 30 may further comprise an audio output part 35 to output sound.

The display 33 according to the embodiment of FIG. 3 is illustrated as using a liquid crystal display (LCD) module, but alternatively may use various other types of display modules, such as a digital light processing (DLP) display module, a plasma display panel (PDP) display module, and the like.

The display 33 comprises an LCD module 33a to display an image thereon, a scaler 33c to perform a scaling function, and a signal processor 33b converting a

video signal in various formats into a video signal to be processed by the scaler 33c.

Herein, a configuration of the display 33 may be changed depending on a format type of the video signal converted by the multimedia data converter 34. For instance, if the multimedia data converter 34 converts the video signal into an analog RGB signal, the signal processor 33b may comprise an A/D (Analog/Digital) converter to convert the analog RGB signal into a digital RGB signal and output the digital RGB signal to the scaler 33c.

Further, if the multimedia data converter 34 outputs a digital RGB signal, it can be directly outputted to the scaler 33c. In this case, the signal processor 33b may not be a necessary component of the display 33.

If the multimedia data converter 34 outputs the video signal in a low voltage differential signaling (LVDS) format, it can be directly outputted to the LCD module 33a. In this case, the display 33 may not need the signal processor 33b and the scaler 33c.

The display controller 31 controls the display 33 to adjust a displaying state of the image displayed on the display 33 according to predetermined parameters for resolution, brightness, and contrast.

The multimedia data converter 34 according to the

embodiment of FIG. 3 may comprise a data sorting part 34a, a video converter 34b and an audio converter 34c.

The data sorting part 34a sorts the multimedia data transmitted through the display network module 32 into
5 video data and audio data, and outputs the video data and the audio data to the video converter 34b and the audio converter 34c, respectively. The video converter 34b converts the video data from the data sorting part 34a into the video signal of the format to be processed by
10 the display 33. In other words, the video converter 34b decodes the video data sorted by the data sorting part 34a, converts the decoded video data into the processable video signal and outputs it to the display 33.

The video converter 34b supports a MPEG-2 (Motion
15 Picture Experts Group-2) decoding function to decode the video data coded using an MPEG-2 standard so as to output the video signal in a MPEG-2 format. Further, the video converter 34b may decode the video data coded using a JPEG (Joint Photographic Experts Group) standard, or
20 other video coding standards.

In addition, the video converter 34b may output the video signal in various formats depending on configurational aspects of the display 33 as described hereinbefore. For example, the video converter 34b
25 supports an LVDS encoding function to encode the decoded

video signal into a LVDS video signal using the LVDS encoding, and output the LDVS video signal to the LCD module 33a. The video converter 34b also outputs the analog RGB signal or the digital RGB signal, and these
5 signals are respectively outputted to the signal processor 33b and the scaler 33c of the display 33.

The audio converter 34c according to the embodiment of FIG. 3 decodes the audio data sorted by the data sorting part 34a. For instance, the audio converter 34c
10 decodes the audio data into the MPEG-2 format, or into an AC-3 (Audio Code-3) format. Herein, if the audio output part 35 is a speaker, the audio converter 34c preferably supports a D/A conversion function converting the decoded audio signal into an analog audio signal to output the
15 analog audio signal to the speaker.

Hereinafter, a computer 10 according to another embodiment of the present general inventive concept will be described, while referring to FIG. 4.

As shown in FIG. 4, the computer 10 according to the
20 present embodiment comprises a central processing unit (CPU) 14, a random access memory (RAM) 15 as a main memory, a hard disk drive (HDD) 16, the computer network module 12 and a system bus 17 connecting these components of the computer 10.

25 An example of the data storage 13 in this embodiment

is the HDD 16. Herein, the data storage 13 may comprise an external storage such as a memory stick connected to the computer 10, or any kind of device which is capable of storing the multimedia data.

5 The computer controller 11 according to the embodiment of FIG. 4 can comprise, for example, an application program executed based on an operating system of the computer 10. Accordingly, the computer controller 11 may be installed and stored in the HDD 16.

10 The computer controller 11 is loaded into the RAM 15 to be run when a user executes the computer controller 11. Herein, the computer controller 11 transmits the multimedia data to the display 30 through the computer network module 12.

15 Further, the computer controller 11 may transmit a control signal to the display apparatus 30 through the computer network module 12 to control an operational state of the display apparatus 30. In this case, the display controller 31 controls the operational state of
20 the display apparatus 30 according to the control signal transmitted through the display network module 32.

For example, the computer controller 11 transmits the control signal to the display 33 of the display apparatus 30 through the network 50 to control a
25 displaying state of an image displayed thereon. In other

words, the computer controller 11 transmits the control signal to the display apparatus 30 through the computer network module 12 to control resolution, brightness and contrast of the image displayed on the display 33. Also
5 the display controller 31 adjusts the resolution, brightness and contrast of the image displayed on the display 33 in accordance with the received control signal. Thus, the user directly controls the displaying state of the images displayed on the displays 33 of plural display
10 apparatuses 30 connected to the computer 10 by the network 50.

Herein, the computer controller 11 detects a data type of the multimedia data transmitted through the computer network module 12, and transmits an appropriate
15 control signal in accordance with the detected data type of the multimedia. For example, if a moving picture file as the multimedia data is transmitted to the display apparatus 30, the computer controller 11 may transmit a predetermined control signal with appropriate levels of
20 resolution, brightness and contrast to display a moving picture. Herein, the computer controller 11 detects the type of the multimedia data by a file extension of the multimedia data.

In addition, the computer controller 11 according to
25 the present embodiment may transmit the control signal to

control a volume level of the sound outputted through the audio output part 35 to the display apparatus 30 through the computer network module 12. In this case, the display controller 31 controls the volume level of the sound
5 outputted to the audio output part 35 according to the control signal transmitted to the computer 10.

Meanwhile, referring back to FIG. 3, the display apparatus 30 according to the embodiment of FIG. 3 may comprise a memory 36 to store information about the
10 operational state of the display apparatus 30. The information about the operational state of the display apparatus 30 may include information about a current displaying state of the image displayed on the display 33, and a current volume level of the sound outputted to the
15 audio output part 35. Herein, the display controller 31 transmits the information about the operational state stored in the memory 36 to the computer 10 through the display network module 32.

Here, the computer controller 11 outputs the control
20 signal on the basis of the information about the operational state transmitted through the network 50. For example, the computer controller 11 transmits a control signal through the network 50 to appropriately control the volume level of the data type of the multimedia data
25 on the basis of the information about the current volume

level of the sound outputted to the audio output part 35 of the display apparatus 30. Further, the computer controller 11 generates a control signal to display the image on the display 33 in the best displaying state based on the information about the current display state of the display 33 and the data type of the multimedia data.

According to the foregoing embodiments, the control signal transmitted to the display apparatus 30 from the computer 10 is described as an example to control the displaying state of the image and/or the volume level of the sound. Further, the computer controller 11 may output a control signal to control various functions of the display apparatus 30 such as turning on/off power of the display apparatus 30.

As described, the computer 10 comprises the computer network module 12 to access through the network 50 for data communication, the data storage 13 to store the multimedia data and the computer controller 11 to transmit the multimedia data stored in the data storage 13 to the display apparatus 30 through the computer network module 12, and the display apparatus 30 comprises the display 33 to display the image thereon, the display network module 32 connected to the computer network module 12 and to receive the multimedia data, the

multimedia data converter 34 to convert the multimedia data into the video signal to be processed by the display 33, and the display controller 31 to control the display 33 to display the video signal converted by the multimedia data converter 34. With this configuration, the plurality of display apparatuses 30 can be connected to the computer 10 using the network 50.

Further, the computer controller 11 transmits the control signal to the display apparatus 30 to control the operational state of the display apparatus 30 through the computer network module 12, and thereby directly adjust the displaying state of the image or the volume level of the sound from the computer 10.

Although a few embodiments of the present general inventive concept have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the general inventive concept, the scope of which is defined in the appended claims and their equivalents.

CLAIMS

What is claimed is:

1. A display system comprising:

a computer comprising a computer network module to
5 access a network for data communication, a data storage
to store multimedia data and a computer controller to
transmit the multimedia data stored in the data storage
through the computer network module; and

a display apparatus comprising a display to display
10 an image thereon, a display network module connected to
the computer network module through the network and to
receive the multimedia data, a multimedia data converter
to convert the multimedia data into a video signal to be
processed by the display, and a display controller to
15 control the display to display the image using the video
signal.

2. The display system according to claim 1,
wherein the display apparatus further comprises an audio
output part to output sound, and

20 the multimedia data converter comprises a data
sorting part to sort the multimedia data into video data
and audio data; a video converter to convert the video
data into the video signal; and an audio converter to
convert the audio data into an audio signal to be
25 outputted through the audio output part.

3. The display system according to claim 2,
wherein the computer controller transmits a control
signal to the display apparatus through the computer
network module to control an operational state of the
5 display apparatus, and the display controller controls a
displaying state of the image displayed on the display
and/or a volume level of the sound outputted to the audio
output part on the basis of the control signal
transmitted through the display network module.

10 4. The display system according to claim 3, wherein
the computer controller detects a data type of the
multimedia data, and transmits a corresponding control
signal based on the detected data type of the multimedia
data.

15 5. The display system according to claim 4,
wherein the computer controller detects the data type of
the multimedia data by a file extension of the multimedia
data.

6. The display system according to claim 4,
20 wherein the display apparatus further comprises a memory
to store information about the operational state of the
display apparatus,

the display controller transmits the information
about the operational state stored in the memory to the
25 computer through the display network module, and the

computer controller outputs the control signal based on the information about the operational state transmitted through the computer display network module.

7. The display system according to claim 6,
5 wherein the information about the operational state comprises at least one of a current displaying state of the image displayed on the display and a current volume level of the audio output part.

8. A display apparatus comprising:
10 a display to display an image thereon;
a display network module to access a network and to transmit/receive data;
a multimedia data converter to convert received multimedia data into a video signal to be processed by
15 the display; and
a display controller to control the display to display the image using the video signal converted by the multimedia data converter.

9. The display apparatus according to claim 8,
20 wherein the display controller detects a given control signal in the data transmitted through the display network module, and controls a displaying state of the image displayed on the display according to the detected control signal.

25 10. The display apparatus according to claim 8,

further comprising an audio output part to output a sound,
and

the multimedia data converter comprising a data
sorting part to sort the multimedia data into video data
5 and audio data; a video converter to convert the video
data into the video signal; an audio converter to convert
the audio data into an audio signal to be output through
the audio output part.

11. The display apparatus according to claim 10,
10 wherein the display controller detects a given control
signal in the data transmitted through the display
network module, and controls a volume level of the sound
outputted to the audio output part according to the
detected control signal.

15 12. A display system comprising:
a computer comprising:
a network communication part to communicate data to
and from a network,
a storage unit to store multimedia data, and
20 a controller unit to transmit the stored multimedia
data through the network communication part; and
a display apparatus comprising:
a display unit to display an image,
a display network module to receive the multimedia
25 data from the network communication part, and

a display controller to control conversion of the multimedia data into a video signal and to control the displaying of the image by the display unit using the converted video signal.

5 13. The display system according to claim 12, wherein the display controller controls conversion of the multimedia data into video data to be outputted through the display unit and audio data to be outputted as sound.

10 14. The display system according to claim 13, wherein the display apparatus further comprises an audio output part to output the audio data as sound.

15 15. The display system according to claim 14, wherein the controller unit transmits a control signal to each of the display apparatus through the network communication part to control an operational state of each display apparatus, and the respective display controller controls a displaying state of the image displayed on the respective display unit and/or a volume level of the sound outputted to the respective audio
20 output part on the basis of the control signal transmitted through the display network module.

25 16. The display system according to claim 15, wherein the controller unit detects a data type of the multimedia data, and transmits a corresponding control signal based on the detected data type of the multimedia

data.

17. The display system according to claim 16, wherein the display apparatus further comprises a memory to store information about the operational state of the display apparatus, and the display controller transmits the information about the operational state stored in the memory to the computer through the display network module, and the controller unit outputs the control signal based on the information about the operational state transmitted through the display network module.

18. A method of displaying multimedia data on a display apparatus using a network, the method comprising:

transmitting the multimedia data from a central location through a network; and

receiving the multimedia data at the display apparatus, converting the multimedia data into a video signal to be processed by each of the display apparatus, and controlling the display of an image at each of the display apparatus using the converted video signal.

19. The method according to claim 18, wherein the converting of the multimedia data comprises:

sorting the multimedia data into video data and audio data;

converting the video data into the video signal to be displayed; and

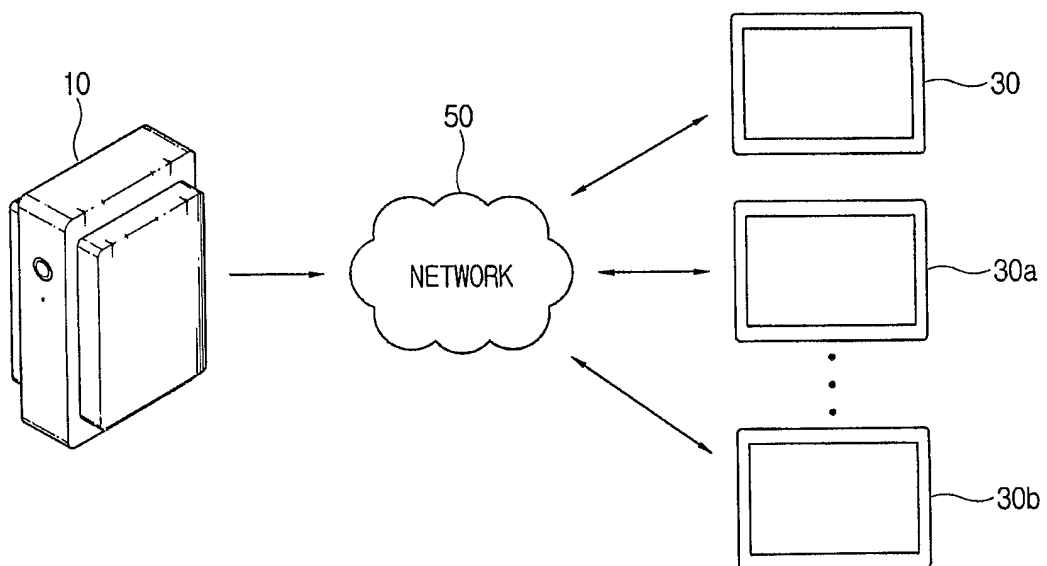
converting the audio data into an audio signal to be output as sound.

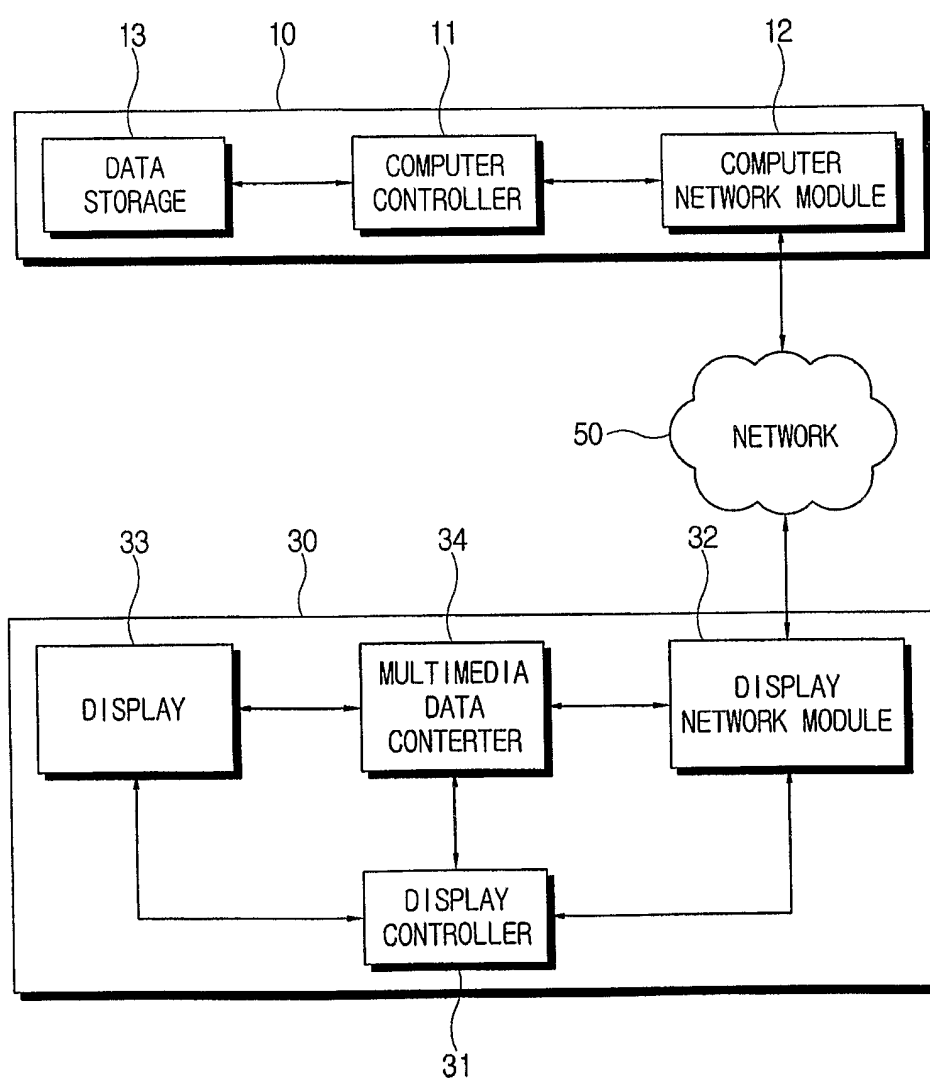
20. The method according to claim 19, further comprising transmitting a control signal to each of the display apparatus through the network from the central location, to control an operational state of each of the display apparatus, controlling the displaying state of the image displayed on each of the display apparatus and/or a volume level of the sound outputted on the basis of the control signal transmitted through the network.

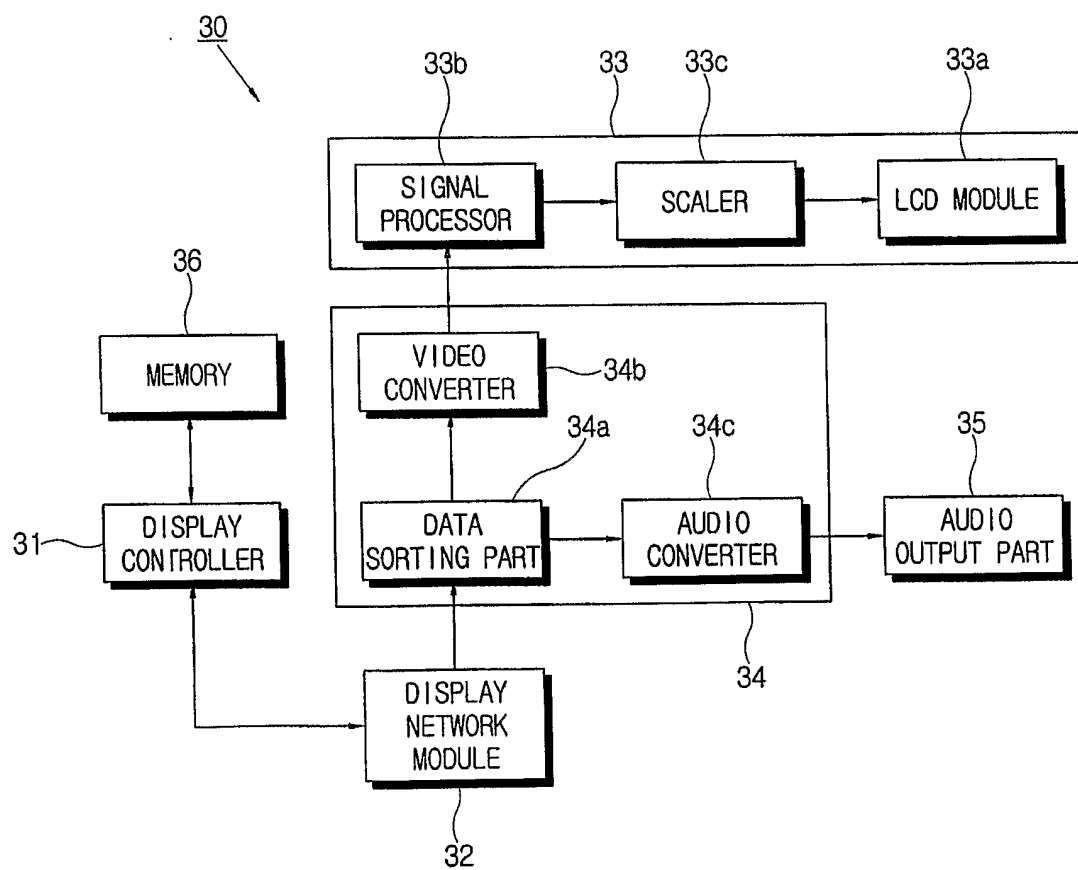
21. The method according to claim 20, wherein the operation of transmitting a control signal comprises detecting a data type of the multimedia data, and transmitting a corresponding control signal based on the detected data type of the multimedia data.

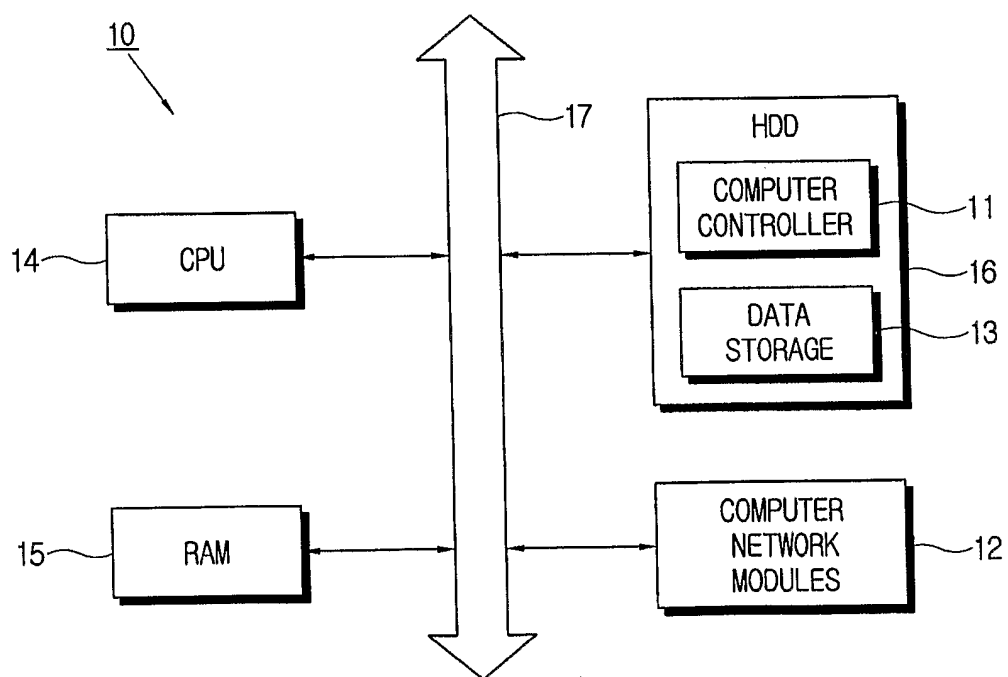
22. The method according to claim 20, wherein the control signal transmitted is based on information received through the network about an operational state of the display apparatus.

1 / 4
FIG. 1



2 / 4
FIG. 2

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FIG. 3

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FIG. 4

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PS8104/PCT	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/KR2005/001786	International filing date (<i>day/month/year</i>) 13 JUNE 2005 (13.06.2005) (Earliest) Priority Date (<i>day/month/year</i>) 14 JUNE 2004 (14.06.2004)
Applicant SAMSUNG ELECTRONICS CO., LTD. et al	

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (See Box No. III)

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 2

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/001786

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 G06F 1/16**

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)

IPC7 G06F 1/16

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

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and application for Utility models since 1975

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

eKIPASS "DISPLAY, CONTROL, PLURAL"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	KR 2005-13865 A (SAMSUNG ELECTRONICS CO., LTD.) 05 FEBRUARY 2005 the whole document	1-22
A	KR 20-0340334 Y1 (HA, HOI OON) 11 FEBRUARY 2004. see the abstract	1
A	JP 2000-181438 A (NEC CORP) 30 JUNE 2000 the whole document	1,8,12,18

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
 "&" document member of the same patent family

Date of the actual completion of the international search

20 SEPTEMBER 2005 (20.09.2005)

Date of mailing of the international search report

20 SEPTEMBER 2005 (20.09.2005)

Name and mailing address of the ISA/KR



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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/001786

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 2005-13865 A	05.02.2005	CN1577302A US20050024392A1 US2005024392AA	09.02.2005 03.02.2005 03.02.2005
KR 20-0340334 Y1	11.02.2004	None	
JP12181438	30.06.2000	JP12181438 JP2000181438A2 JP3267256B2	30.06.2000 30.06.2000 18.03.2002