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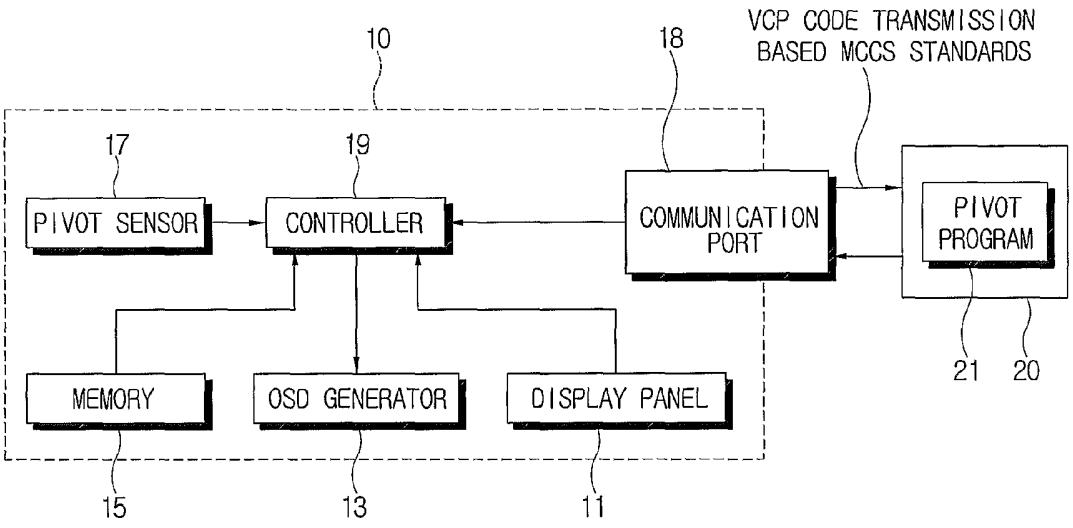
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** DISPLAY APPARATUS, CONTROL METHOD THEREOF, AND DISPLAY SYSTEM



(57) **Abstract:** A display apparatus including a communication port to communicate with an external source, an on screen display (OSD) generator to generate an OSD menu, and a display panel to display the OSD menu thereon, the display apparatus further including a pivot sensor to sense a pivoting angle of the display panel, and output data corresponding to the pivoting angle when the display panel is pivoted, and a controller to set an OSD displaying direction of the OSD generator according to the data about the pivoting angle from the pivot sensor, and transmit the data relating to the pivoting angle to the external source through the communication port.

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DISPLAY APPARATUS, CONTROL METHOD THEREOF, AND DISPLAY SYSTEM

FIELD OF THE INVENTION

The present invention relates to a display apparatus, a control method thereof, and a display system, and more particularly, to a display apparatus having a pivoting function, a control method thereof, and a display system.

BACKGROUND ART

A conventional display apparatus processes a video signal transmitted, which has a predetermined format, from an internal or external source, thereby displaying an image.

The display apparatus may be a liquid crystal display (LCD), a plasma display panel (PDP), an organic electroluminescent display (OLED), etc., having a pivotable display panel. Thus, the display panel may be rotated with respect to a perpendicular axis to its surface so as to arrange in a landscape or portrait direction, which is referred to as a pivot function.

To use the pivot function, a computer should include a video card capable of supporting the pivot function and/or have a software program supporting a pivot function.

In the conventional display apparatus having the pivot function, a user pivots the display panel on a perpendicular axis to its surface, and then selects a pivoting angle through

an input unit, such as a keyboard or the like. Thus, the computer processes an input video signal corresponding with the pivoting function selected by a user, and transmits the processed video signal to the display apparatus.

The display apparatus processes the received video signal through a scaler or the like, and displays an image according to the video signal. Meanwhile, an on screen display (OSD) menu provided in the display apparatus is also rotated by a pivoting command transmitted from the computer.

However, in the conventional display apparatus with the pivoting function, a user should separately rotate the display panel at a predetermined angle in order to use the pivoting function and select the pivoting angle in detail through a predetermined input unit, which makes the pivoting function time-consuming and difficult to use.

DISCLOSURE OF INVENTION

An aspect of the present invention is to provide a display apparatus having a pivoting function, a control method thereof and a display system, in which a pivoting angle of a display panel is automatically sensed, an OSD menu is automatically rotated on the basis of the pivoting angle, and corresponding data is output to an external source, thereby fulfilling the pivoting function.

Additional features of the invention will be set forth in

the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention.

The invention provides a display apparatus including a communication port communicating with an external source, an on screen display generator generating an on screen display menu, a display panel displaying the on screen display menu thereon, the display apparatus further including a pivot sensor sensing a pivoting angle of the display panel and outputting data corresponding to the pivoting angle when the display panel is pivoted, and a controller setting an on screen display displaying direction of the on screen display generator according to the data relating to the pivoting angle from the pivot sensor and transmitting the data relating to the pivoting angle to the external source through the communication port.

According to an aspect of the present invention, the display apparatus further comprises a memory storing the data relating to the pivoting angle of the display panel, wherein the controller replaces the data relating to the pivoting angle stored in the memory with the data relating to the pivoting angle sensed by the pivot sensor when the data relating to the pivoting angle sensed by the pivot sensor is not equal to the data relating to the pivoting angle stored in the memory.

According to an aspect of the present invention, the OSD displaying direction comprises a -90 degree angle, and/or a 90

degree angle, and/or a 180 degree angle.

According to an aspect of the present invention, the controller transmits the data of the pivoting angle as a virtual control panel code based on monitor control command set standards to the external source through the communication port.

According to an aspect of the present invention, the controller transmits the data of the pivoting angle to the external source through the communication port as a virtual control panel code based on monitor control command set standards.

According to an aspect of the present invention, the controller transmits the data of the pivoting angle to the external source through the communication port as a virtual control panel code based on monitor control command set standards.

The invention further provides a display system including an external source processing a video signal, a display apparatus having a pivoting function, including a communication port communicating with the external source, an on screen display generator generating an on screen display menu, a display panel displaying the on screen display menu thereon, a memory storing data relating to a pivoting angle of the display panel, a pivot sensor sensing the pivoting angle of the display panel and outputting data corresponding to the pivoting angle

when the display panel is pivoted by a user, and a controller comparing the data relating to the pivoting angle sensed by the pivot sensor with the data relating to the pivoting angle stored in the memory, setting an on screen display displaying direction of the on screen display generator on the basis of the data relating to the pivoting angle from the pivot sensor when the data relating to the pivoting angle sensed by the pivot sensor is not equal to the data relating to the pivoting angle stored in the memory, and transmitting the data relating to the pivoting angle to the external source through the communication port, wherein the external source processes the video signal according to the data relating to the pivoting angle received through the communication port and transmits the processed video signal to the display apparatus.

According to an aspect of the present invention, the controller transmits the data relating to the pivoting angle of the display panel stored in the memory to the external source through the communication port when the external source requests the data relating to the pivoting angle of the display panel.

According to an aspect of the present invention, the controller transmits the data relating to the pivoting angle to the external source through the communication port as a virtual control panel code according to monitor control command set standards, and wherein the external source includes a computer

having a pivot program recognizing the virtual control panel code according to the monitor control command set standards.

According to an aspect of the present invention, the controller transmits the data about the pivoting angle to the external source through the communication port as a virtual control panel code according to monitor control command set standards, and wherein the external source includes a computer having a pivot program recognizing the virtual control panel code according to the monitor control command set standards.

The invention further provides for a method of controlling a display apparatus including a communication port communicating with an external source, an on screen display generator generating an on screen display menu, and a display panel displaying the on screen display menu thereon, the method including storing data relating to a pivoting angle of the display panel, sensing the pivoting angle of the display panel and outputting data relating to the sensed pivoting angle, comparing the sensed data relating to the pivoting angle with the stored data relating to the pivoting angle, and setting an on screen display displaying a direction of the on screen display generator according to the sensed data relating to the pivoting angle when the output data relating to the pivoting angle is not equal to the stored data relating to the pivoting angle, and transmitting the data relating to the pivoting angle

to the external source through the communication port.

According to an aspect of the present invention, the on screen display displaying direction comprises a -90 degree angle, and/or a 90 degree angle, and/or a 180 degree angle.

According to an aspect of the present invention, the data transmitted to the external source comprises a virtual control panel code according to monitor control command set standards.

According to an aspect of the present invention, the data transmitted to the external source comprises a virtual control panel code according to monitor control command set standards.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

FIG. 1 is a control block diagram of a display system comprising a display apparatus according to an embodiment of the invention.

FIG. 2 is a control flowchart of a display apparatus

according to another embodiment of the invention.

MODES FOR CARRYING OUT THE INVENTION

Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments of a display system comprising a display apparatus 10 and a computer 20 are described below in order to explain the present invention by referring to the figures.

FIG. 1 is a control block diagram of a display apparatus according to an embodiment of the invention.

Referring to FIG. 1, there is provided a display apparatus 10 that includes a display panel 11 to display an image according to a processed video signal, an OSD generator 13 to generate an OSD menu, a pivot sensor 17 to sense a pivoting angle of the display panel 11 and output a corresponding signal, a communication port 18 to communicate with an external source, and a controller 19 to control the display apparatus 10. The display apparatus 10 may further include a memory 15 to store data relating to the pivoting angle of the display panel 11.

The display panel 11 processes a video signal received through an internal source or an external source, and displays an image thereon. Here, the display panel 11 may be realized by an LCD, a PDP, or etc.

Further, the display panel 11 has a pivotable structure, e.g., rotatable, turnable, moveable, spinable, etc., and its pivoting angle is determined according to the pivotable structure.

The OSD generator 13 generates a video signal for the OSD menu for adjusting information relating to a video signal received from the external source and information relating to the display apparatus 10. The OSD generator 13 may be realized by an OSD integrated chip (IC).

The OSD menu generated by the OSD generator 13 and displayed on the display panel 11 includes various OSD items for adjusting information relating to an effective area position, color, etc. of the display apparatus 10 or information about the video signal.

The memory 15 may be realized by an erasable programmable read only memory (EPROM), an electrical erasable programmable read only memory (EEPROM), a register, or the like. Thus, data may be reread and rewritten from the memory 15.

The data relating to the pivoting angle of the display panel is stored in the memory 15 and may include at least one of -90 degrees, 90 degrees, and 180 degrees.

The pivot sensor 17 senses the pivoting angle of the display panel 11 and outputs sensed data to the controller 19. The pivot sensor 17 may be realized by a pivoting angle sensing

IC.

The pivot sensor 17 may output signals having different electrical potential according to the pivoting angles. Further, the pivot sensor 17 outputs a corresponding signal when the pivoting angle is more or less than a predetermined reference angle, thereby preventing a sensitive operation. The pivot sensor 17 may be designed to only output a corresponding signal when the pivoting angle is more or less than a predetermined than the predetermined reference angle. In a non-limiting example, the pivot sensor 17 may not output the signal when the pivoting angle is within a range from 0 degree to 30 degrees.

An allowable pivoting angle of the display panel 11 may be divided into predetermined ranges, and the same signal may be output with regard to the pivoting angles corresponding to the same range. For example, the allowable pivoting angle may be divided into a range from -30 degrees to 30 degrees, a range from 50 degrees to 120 degrees, and a range from 150 degrees to 210 degrees, and the same signal is output with regard to the same range.

The communication port 18 enables the data to communicate with the external source and is connected with a communication cable, such as a digital video interface (DVI) connector, a high definition multimedia interface (HDMI) connector, etc.

The controller 19 checks the sensed signal output from the

pivot sensor 17, sets an OSD pivoting angle as an OSD displaying direction arranging the OSD menu generated by the OSD generator 13, and transmits the corresponding signal to the external source through the communication port 18, wherein the controller 19 may be realized by a micro control unit (MCU).

The controller 19 may further include an OSD pivot program to pivot the OSD menu.

The controller 19 sets the OSD pivoting angle, and converts an OSD video signal output from the OSD generator 13 into a signal corresponding with the pivoted image by using a process or an equation that is different depending on the pivoting angles, thereby controlling the OSD menu on the display panel 11.

When the display panel 11 is pivoted from a pivoting angle having a range between 0 degree to 180 degrees, the respective video signals are reversed with respect to each other, such that the controller 19 reverses the video signal in order to display an image, and vice versa. Similarly, the controller 19 reverses the video signal when the display panel 11 is pivoted from a pivoting angle having a range of between -90 degrees to 90 degrees, and vice versa.

The controller 19 may further control the memory 15 to store the sensed signal of the pivot sensor 17 therein, and control the display panel 11 to display the OSD menu and an image according to the video signal output from the external

source according to the pivoting angle data stored in the memory 15 when power is on.

According to an embodiment of the invention, a computer 20 may be used as the external source (refer to FIG. 1).

The computer 20 has a pivot program 21. The controller 19 outputs a signal relating to the pivoting angle as a virtual control panel (VCP) code command according to monitor control command set (MCCS) standards through the communication port 18.

Further, when the computer 20 requests the controller 19 to send the data relating to the pivoting angle of the display panel 11, the controller 19 reads the data from the memory 15 and then outputs the data as the VCP code based on the MCCS standards.

The pivot program 21 of the computer 20 recognizes the signal transmitted from the display apparatus 10 and transforms the video signal transmitted from the computer 20 to the display apparatus 10 in correspondence with the pivoting angle of the display panel 11, thereby rotating the image according to the video signal.

Therefore, even when a user does not know how to use the pivot program 21, the pivoting angle of the display panel 11 is automatically sensed when the display panel 11 is pivoted, so that an image according to the video signal from the external source as well as the OSD menu is properly displayed according

to the pivoting angles.

FIG. 2 is a control flowchart of a display apparatus according to another embodiment of the present invention. A display apparatus 10 according to the embodiment of the invention discussed below and described with reference to FIG. 2, has the same configuration as the configuration of the display apparatus of the embodiment of the invention discussed above and shown in FIG. 1, and thus repetitive descriptions are avoided as necessary.

Referring to FIG. 2, in a non-limiting embodiment of the invention, the controller 19 controls the memory 15 to store the data relating to the pivoting angle of the display panel 11 sensed by the pivot sensor 17, as shown at operation S10.

When the display apparatus 10 is turned on, the controller 19 controls the OSD menu to be generated according to the data relating to the pivoting angle stored in the memory 15, and transmits the data to the computer 20 by reading out the data from the memory 15 when the computer 20 requests the corresponding data.

The pivot sensor 17 senses whether the display panel 11 is pivoted, and outputs a signal corresponding to the pivoting angles. The controller 19 checks the signal corresponding to the pivoting angle, as shown at operation S11.

The controller 19 compares the data relating to the

pivoting angle sensed by the pivot sensor 17 with the data relating to the pivoting angle stored in the memory 15, as shown at operation S13.

When the data of the pivot sensor 17 is not equal to the data of the memory 15, the OSD menu is rotated according to the data from the pivot sensor 17, and the data from the pivot sensor 17 is transmitted to the external source, as shown at operation S14.

Further, the data relating to the pivoting angle stored in the memory 15 is replaced by the data relating to the pivoting angle sensed by the pivot sensor 17, and then stored in the memory 15, as shown at operation S10.

The foregoing control flowchart of the controller 19 may vary according to its programming methods.

As described above, the present invention provides a display apparatus, a control method thereof and a display system, in which a pivoting angle of a display panel is automatically sensed, an OSD menu is automatically rotated according to the pivoting angle, and corresponding data is output to an external source, thereby completing the pivoting operation.

It will be apparent to those skilled in the art that various modifications and variation can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover

the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

CLAIMS

What is claimed is:

1. A display apparatus comprises:

a communication port communicating with an external source;

an on screen display generator generating an on screen display menu;

a display panel displaying the on screen display menu thereon, the display apparatus further comprising:

a pivot sensor sensing a pivoting angle of the display panel and outputting data corresponding to the pivoting angle when the display panel is pivoted; and

a controller setting an on screen display displaying direction of the on screen display generator according to the data relating to the pivoting angle from the pivot sensor and transmitting the data relating to the pivoting angle to the external source through the communication port.

2. The display apparatus of claim 1, further comprising:

a memory storing the data relating to the pivoting angle of the display panel, wherein

the controller replaces the data relating to the pivoting angle stored in the memory with the data relating to the pivoting angle sensed by the pivot sensor when the data relating

to the pivoting angle sensed by the pivot sensor is not equal to the data relating to the pivoting angle stored in the memory.

3. The display apparatus of claim 1, wherein the OSD displaying direction comprises a -90 degree angle, and/or a 90 degree angle, and/or a 180 degree angle.

4. The display apparatus of claim 1, wherein the controller transmits the data of the pivoting angle as a virtual control panel code based on monitor control command set standards to the external source through the communication port.

5. The display apparatus of claim 2, wherein the controller transmits the data of the pivoting angle to the external source through the communication port as a virtual control panel code based on monitor control command set standards.

6. The display apparatus of claim 3, wherein the controller transmits the data of the pivoting angle to the external source through the communication port as a virtual control panel code based on monitor control command set standards.

7. A display system comprising:

an external source processing a video signal;

a display apparatus having a pivoting function, comprising:

a communication port communicating with the external source,

an on screen display generator generating an on screen display menu,

a display panel displaying the on screen display menu thereon,

a memory storing data relating to a pivoting angle of the display panel,

a pivot sensor sensing the pivoting angle of the display panel and outputting data corresponding to the pivoting angle when the display panel is pivoted by a user, and

a controller comparing the data relating to the pivoting angle sensed by the pivot sensor with the data relating to the pivoting angle stored in the memory, setting an on screen display displaying direction of the on screen display generator on the basis of the data relating to the pivoting angle from the pivot sensor when the data relating to the pivoting angle sensed by the pivot sensor is not equal to the data relating to the pivoting angle stored in the memory, and transmitting the data relating to the pivoting angle to the external source through the communication port,

wherein the external source processes the video signal according to the data relating to the pivoting angle received through the communication port and transmits the processed video signal to the display apparatus.

8. The display system of claim 7, wherein the controller transmits the data relating to the pivoting angle of the display panel stored in the memory to the external source through the communication port when the external source requests the data relating to the pivoting angle of the display panel.

9. The display system of claim 7, wherein the controller transmits the data relating to the pivoting angle to the external source through the communication port as a virtual control panel code according to monitor control command set standards, and

wherein the external source includes a computer having a pivot program recognizing the virtual control panel code according to the monitor control command set standards.

10. The display system of claim 8, wherein the controller transmits the data about the pivoting angle to the external source through the communication port as a virtual control panel code according to monitor control command set standards, and

wherein the external source includes a computer having a pivot program recognizing the virtual control panel code according to the monitor control command set standards.

11. A method of controlling a display apparatus comprising a communication port communicating with an external source, an on screen display generator generating an on screen display menu, and a display panel displaying the on screen display menu thereon, the method comprising:

storing data relating to a pivoting angle of the display panel;

sensing the pivoting angle of the display panel and outputting data relating to the sensed pivoting angle;

comparing the sensed data relating to the pivoting angle with the stored data relating to the pivoting angle; and

setting an on screen display displaying a direction of the on screen display generator according to the sensed data relating to the pivoting angle when the output data relating to the pivoting angle is not equal to the stored data relating to the pivoting angle, and transmitting the data relating to the pivoting angle to the external source through the communication port.

12. The method of claim 11, wherein the on screen display displaying direction comprises a -90 degree angle, and/or a 90 degree angle, and/or a 180 degree angle.

13. The method of claim 11, wherein the data transmitted to the external source comprises a virtual control panel code according to monitor control command set standards.

14. The method of claim 12, wherein the data transmitted to the external source comprises a virtual control panel code according to monitor control command set standards.

FIG. 1

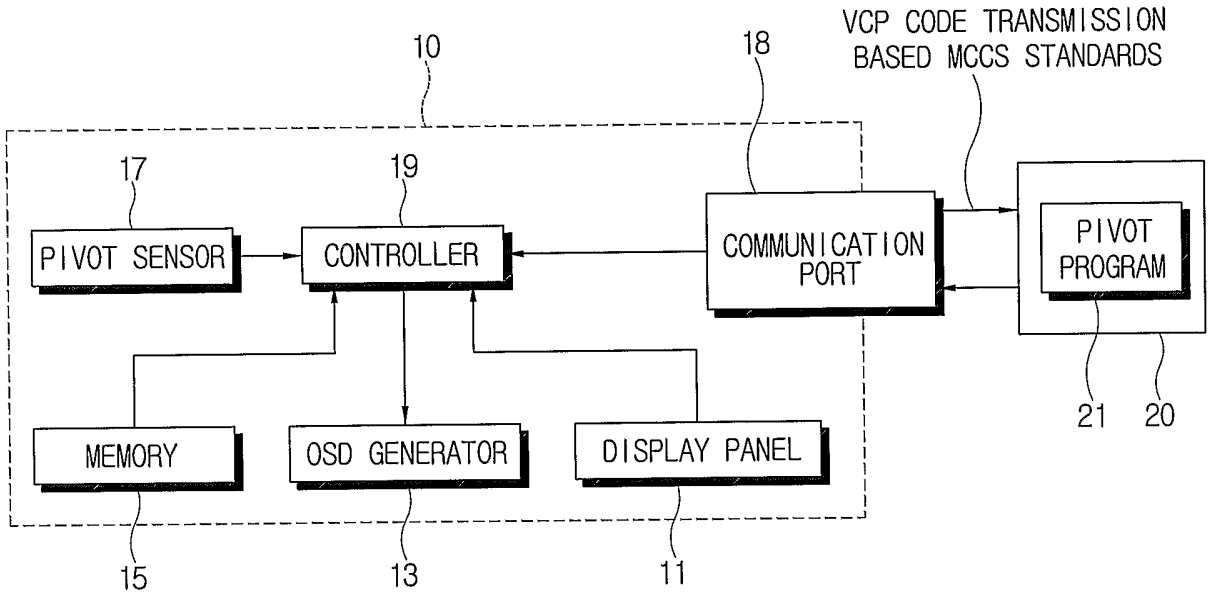
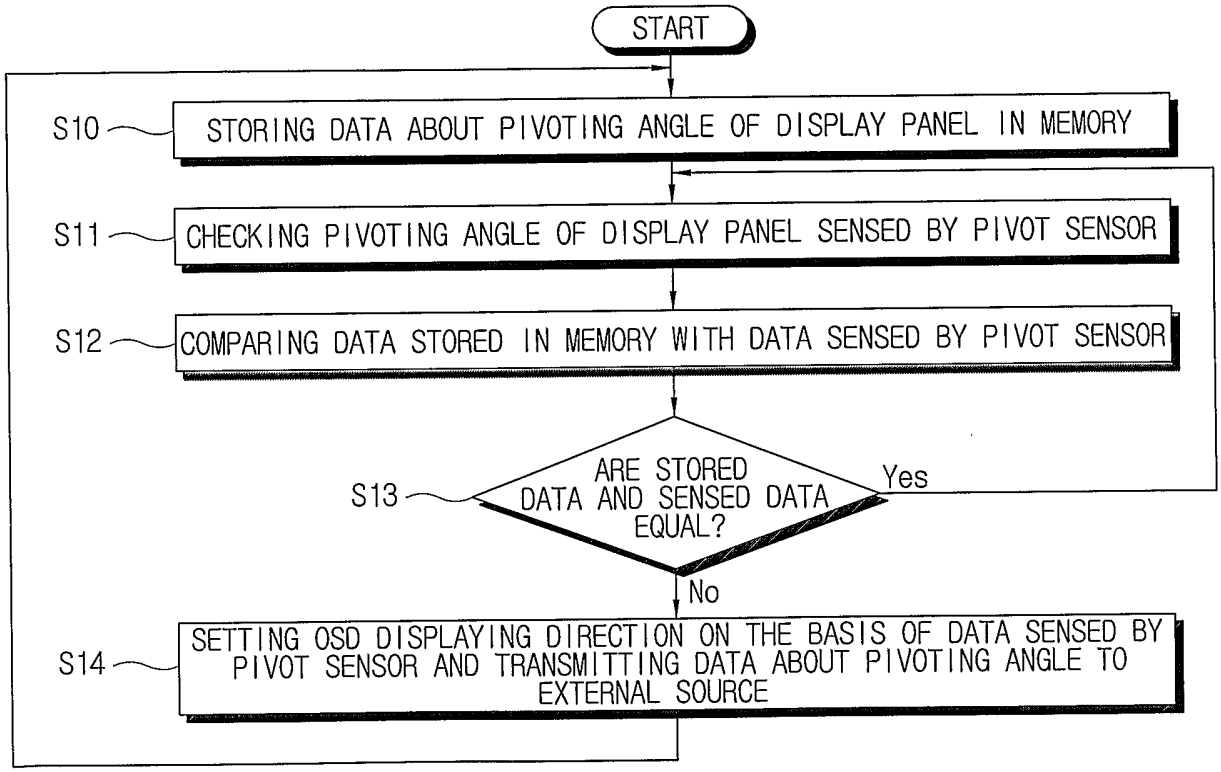

10
18
VCP CODE TRANSMISSION
BASED MCCS STANDARDS
17
19
PIVOT SENSOR
CONTROLLER
COMMUNICATION
PORT
PIVOT
PROGRAM
21
20
MEMORY
OSD GENERATOR
DISPLAY PANEL
15
13
11

FIG. 2


START
S10
STORING DATA ABOUT PIVOTING ANGLE OF DISPLAY PANEL IN MEMORY
S11
CHECKING PIVOTING ANGLE OF DISPLAY PANEL SENSED BY PIVOT SENSOR
S12
COMPARING DATA STORED IN MEMORY WITH DATA SENSED BY PIVOT SENSOR
S13
ARE STORED DATA AND SENSED DATA EQUAL?
Yes
No
S14
SETTING OSD DISPLAYING DIRECTION ON THE BASIS OF DATA SENSED BY PIVOT SENSOR AND TRANSMITTING DATA ABOUT PIVOTING ANGLE TO EXTERNAL SOURCE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/003250

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/14(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC8 G06F, H04N

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

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
NPS: "rotation, display, pivoting, OSD(On Screen Display), LCD(Liquid Display Panel)"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR1020010097994A (LG Electronics Co. Ltd.) 08.11.2001 See the whole document.	1-14
Y	KR1020040078947A (LG Electronics Co. Ltd.) 14.09.2004 See the whole document.	1-14
Y, P	KR1020050041151A (Samsung SDI Co. Ltd.) 04.05.2005 See the whole document.	1-14
Y	US6346972B1 (Samsung Electronics Co. Ltd.) 12.02.2002 See the whole document.	1-14
Y	KR1020030000714 A (LG Electronics Co. Ltd.) 06.01.2003 See the whole document.	1-14
Y	KR1020030080131A (LG Electronics Co. Ltd.) 11.10.2003 See the whole document.	1-14
Y	KR1020020004390A (Baek, et. al.) 16.01.2002 See the whole document.	1-14

☒ 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	Date of mailing of the international search report
10 JANUARY 2006 (10.01.2006)	**10 JANUARY 2006 (10.01.2006)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer KIM, Kyeoun Soo Telephone No. 82-42-481-8174

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/003250

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR1020010073842A (LG Information & Communications Co. Ltd.) 03.08.2001 See the whole document.	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2005/003250

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR1020010097994A	08.11.2001	None	
KR1020040078947A	14.09.2004	None	
KR1020050041151A	04.05.2005	None	
US6346972B1	12.02.2002	CN1275856A KR2000074855A TW451589B	06.12.2000 15.12.2000 21.08.2001
KR1020030000714A	06.01.2003	None	
KR1020030080131A	11.10.2003	None	
KR1020020004390A	16.01.2002	None	
KR1020010073842A	03.08.2001	None	