United States Patent Application Publication	20250267401
Kind Code	A1
Publication Date	August 21, 2025
Inventor(s)	Chiang; Chin-Fu et al.

DISPLAY APPARATUS AND SOUND RECEPTION CONTROL METHOD THEREOF

Abstract

A display apparatus includes a first display device having two first sound reception units, a second display device having two second sound reception units, and a sound reception processor. The second display device is connected to a side of the first display device. The sound reception processor is coupled to the first sound reception units and the second sound reception units. The sound reception processor turns on at least one of the first sound reception units to receive sound in a first normal direction of the first display device for generating a first directional sound signal, turns on at least one of the second sound reception units to receive sound in a second normal direction of the second display device for generating a second directional sound signal, and generates a stereo signal according to the first directional sound signal and the second directional sound signal.

Inventors: **Chiang; Chin-Fu (New Taipei City, TW), Li; Chih-Wen (Taoyuan City, TW)**

Applicant: **BENQ CORPORATION** (Taipei City, TW)

Family ID: **1000008069442**

Assignee: **BENQ CORPORATION (Taipei City, TW)**

Appl. No.: **18/803622**

Filed: **August 13, 2024**

Foreign Application Priority Data

TW	113105526	Feb. 16, 2024

Publication Classification

Int. Cl.: **H04R3/00** (20060101); **H04R1/02** (20060101); **H04R5/027** (20060101); **H04S3/00** (20060101)

U.S. Cl.:

CPC **H04R3/005** (20130101); **H04R1/028** (20130101); **H04R5/027** (20130101); **H04S3/008** (20130101); H04R2499/15 (20130101); H04S2400/01 (20130101); H04S2400/15 (20130101)

Background/Summary

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a display apparatus and a sound reception control method thereof, and more specifically, to a display apparatus utilizing a sound reception processor to selectively turn on sound reception units on display devices connected to each other for generating a stereo signal and a sound reception control method thereof.

2. Description of the Prior Art

[0002] In general, when a display device incorporates sound reception units (e.g., microphones) for sound reception operations, no matter only one sound reception unit is placed on one side of the display device or two sound reception units are placed on both sides of the display device, the display device will only synthesize received sound signals into a sound signal with one single sound channel since a direction of sound reception is often at the same angle. However, the aforesaid sound signal with one single sound channel does not include sound channel information, such as time differences, sound pressure differences, or phase differences between sound channels. Therefore, when a speaker device of the display device plays the sound signal generated by the sound reception unit, the display device is unable to demonstrate the directionality of the sound signal to create a stereo effect.

[0003] Thus, even in the application situation where multiple display devices are arranged side by side to construct a widescreen display device, each display device still only processes sound signals received by its own sound reception units into a mono-channel sound signal. Therefore, the aforesaid multi-display assembly design also cannot provide a multi-channel stereo effect, thereby significantly affecting a user's audio-visual experience when watching multimedia content played on the assembled display devices.

SUMMARY OF THE INVENTION

[0004] The present invention provides a display apparatus including a first display device, a second display device, and a sound reception processor. The first display device has at least two first sound reception units. The second display device is connected to a side of the first display device and has at least two second sound reception units. The sound reception processor is electrically connected to the at least two first sound reception units and the at least two second sound reception units. The sound reception processor turns on at least one of the at least two first sound reception units to receive sound in a first normal direction of the first display device to generate a first directional sound signal, turns on at least one of the at least two second sound reception units to receive sound in a second normal direction of the second display device to generate a second directional sound signal, and generates a stereo signal according to the first directional sound signal and the second directional sound signal.

[0005] The present invention further provides a sound reception control method for a display apparatus. The display apparatus includes a first display device and a second display device. The first display device has at least two first sound reception units. The second display device is connected to a side of the first display device and has at least two second sound reception units. The sound reception control method includes a sound reception processor turning on at least one of

the at least two first sound reception units to receive sound in a first normal direction of the first display device to generate a first directional sound signal, the sound reception processor turning on at least one of the at least two second sound reception units to receive sound in a second normal direction of the second display device to generate a second directional sound signal, and the sound reception processor generating a stereo signal according to the first directional sound signal and the second directional sound signal.

[0006] These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a diagram of a display apparatus according to an embodiment of the present invention.

[0008] FIG. **2** is a flowchart of a sound reception control method according to an embodiment of the present invention.

[0009] FIG. **3** is a diagram of a display apparatus according to another embodiment of the present invention.

DETAILED DESCRIPTION

[0010] The present invention will now be described more specifically with reference to the following embodiments and the accompanying drawings. Other advantages and effects of the present invention can be easily understood by a person ordinarily skilled in the art in view of the detailed descriptions and the accompanying drawings. The present invention can be implemented or applied to other different embodiments. Certain aspects of the present invention are not limited by the particular details of the examples illustrated herein. Without departing from the spirit and scope of the present invention, the present invention will have other modifications and changes. It should be understood that the appended drawings are not necessarily drawn to scale and the configuration of each component (e.g., structural designs of display devices and relative positional relationships among display devices, a sound reception processor and sound reception units) in the drawings is merely illustrative, not presenting an actual condition of the embodiments.

[0011] Please refer to FIG. **1**, which is a diagram of a display apparatus **10** according to an embodiment of the present invention. For clearly showing the circuit layout configuration of a sound reception processor and sound reception units, a sound reception processor **18** and sound reception units on the display apparatus **10** are simply indicated with dashed lines. As shown in FIG. **1**, the display apparatus **10** includes a first display device **12**, a second display device **14**, at least one third display device **16** (one shown in FIG. **1**, but not limited thereto, meaning the connection number of display devices depends on the actual application needs of the display apparatus **10**), and the sound reception processor **18**, thereby constructing a wide-screen display device formed by three display devices side by side. The related description for the display connection design of the display apparatus **10** is commonly seen in the prior art and omitted herein.

[0012] The first display device **12** is provided with at least two first sound reception units **20**. The second display device **14** is connected to one side of the first display device **12** and is provided with at least two second sound reception units **22**. The third display device **16** is connected to another side of the first display device **12** and is provided with at least two third sound reception units **24**. The first display device **12**, the second display device **14**, and the third display device **16** could be preferably LCD (Liquid Crystal Display) screens (e.g., TFT (Thin Film Transistor) screens, OLED (Organic Light Emitting Diode) screens, or micro LED (Light Emitting Diode) screens, but not limited thereto). Connection angles (e.g., connection angles θ1 and θ2 shown in

FIG. **1**) could be preferably less than 180 degrees to produce an audio-visual surround effect (but not limited thereto, meaning that the present invention could adopt a parallel side-by-side connection design in another embodiment). The first sound reception units **20**, the second sound reception units **22**, and the third sound reception units **24** could be preferably microphones, and there could be preferably two sound reception units arranged on left and right sides of each display device. However, the type and number/position of sound reception units used in the present invention could be not limited thereto, and it depends on the actual application needs of the display apparatus **10**. The sound reception processor **18** is electrically connected to the first sound reception units **20**, the second sound reception units **22**, and the third sound reception units **24**. The sound reception processor **18** could be any form of processing device, such as a central processing unit, a microprocessor, a logic processor, or a programmable chip, to perform subsequent multi-channel audio processing, and could be integrated with any audio-visual processing application software.

[0013] Via the aforesaid design, the sound reception processor **18** could turn on at least one of the first sound reception units **20** to receive sound in a first normal direction N**1** of the first display device **12** to generate a first directional sound signal, turn on at least one of the second sound reception units **22** to receive sound in a second normal direction N**2** of the second display device **14** to generate a second directional sound signal, and turn on at least one of the third sound reception units **24** to receive sound in a third normal direction N**3** of the third display device **16** to generate a third directional sound signal. The sound reception processor **18** could then generate a stereo signal with multiple channels according to the first directional sound signal received by the first sound reception unit **20**, the second directional sound signal received by the second sound reception unit **22**, and the third directional sound signal received by the third sound reception unit **24**, allowing the display apparatus **10** to provide a multi-channel stereo effect.

[0014] More detailed description for the sound reception control method provided by the present invention is provided as follows. Please refer to FIG. **2**, which is a flowchart of the sound reception control method according to an embodiment of the present invention. The sound reception control method executed by the display apparatus **10** includes the following steps.

[0015] Step S**20**: The sound reception processor **18** turns on at least one of the first sound reception units **20**, at least one of the second sound reception units **22**, and at least one of the third sound reception units **24** to respectively generate a first directional sound signal, a second directional sound signal, and a third directional sound signal.

[0016] Step S**22**: The sound reception processor **18** generates a stereo signal based on the first directional sound signal, the second directional sound signal, and the third directional sound signal.

[0017] Step S**24**: The display apparatus **10** plays the stereo signal to generate a multi-channel stereo effect.

[0018] The detailed description for the above steps is provided as follows. First, in Step S**20**, to achieve a better stereo effect, the sound reception processor **18** could selectively turn on the first sound reception unit **20** of the first display device **12** that is relatively close to the second display device **14** (i.e., the first sound reception unit **20** on a left side of the first display device **12**, but not limited thereto, meaning that the sound reception processor **18** could turn on the first sound reception unit **20** on a right side of the first display device **12** that is relatively close to the third display device **16**) to receive sound in a first normal direction N**1**, thereby generating the first directional sound signal corresponding to a front sound channel of the display apparatus **10**. At the same time, the sound reception processor **18** could also turn on the second sound reception unit **22** of the second display device **14** that is relatively far from the first display device **12** (i.e., the second sound reception unit **22** on a leftmost side of the second display device **14**) to receive sound in a second normal direction N**2**, thereby generating the second directional sound signal with a relatively large phase difference/sound pressure difference and corresponding to a left sound channel of the display apparatus **10**. Similarly, the sound reception processor **18** could also turn on

the third sound reception unit **24** of the third display device **16** that is relatively far from the first display device **12** (i.e., the third sound reception unit **24** on a rightmost side of the third display device **16**) to receive sound in a third normal direction N**3**, thereby generating the third directional sound signal with a relatively large phase difference/sound pressure difference and corresponding to a right sound channel of the display apparatus **10**.

[0019] Next, in Step S**22**, the sound reception processor **18** could receive the first directional sound signal (herein regarded as a front sound channel signal), the second directional sound signal (herein regarded as a left sound channel signal), and the third directional sound signal (herein regarded as a right sound channel signal), so as to generate the stereo signal with three sound channels. As described in Step S**24**, the stereo signal could be transmitted to the display apparatus **10** for playback (e.g., played through built-in or external speaker devices of the display apparatus **10**), thereby providing a three-channel stereo effect when a user operates the display apparatus **10** to play multimedia content.

[0020] Thus, via the aforesaid sound reception control method of selectively turning on at least one sound reception unit on each display device, the display apparatus provided by the present invention can obtain directional sound signals with relatively large phase differences/sound pressure differences and synthesize these directional sound signals into a corresponding multi-channel stereo signal, so as to effectively solve the prior art problem that each display device only processes sound signals received by its own sound reception units into a mono-channel sound signal and cannot provide a multi-channel stereo effect. Thus, the present invention can greatly enhance the user's audio-visual experience when watching multimedia content played on spliced display devices.

[0021] It should be mentioned that the present invention could also adopt a sound reception control method that simultaneously turns on multiple second sound reception units on the second display device **14** and multiple third sound reception units on the third display device **16**. For example, as shown in FIG. **1**, since the second sound reception units **22** on the left and right sides of the second display device **14** could respectively receive directional sound signals with different phase differences, and the third sound reception units **24** on the left and right sides of the third display device **16** could also respectively receive directional sound signals with different phase differences, the sound reception processor **18** could simultaneously turn on the second sound reception units **22** on the left and right sides of the second display device **14** to generate the second directional sound signal, which includes a first side sound channel signal and a second side sound channel signal with different phase differences/sound pressure differences. At the same time, the sound reception processor **18** could also simultaneously turn on the third sound reception units **24** on the left and right sides of the third display device **16** to generate the third directional sound signal, which includes a third side sound channel signal and a fourth side sound channel signal with different phase differences/sound pressure differences.

[0022] Next, the sound reception processor **18** could receive the aforesaid first directional sound signal (herein regarded as a front sound channel signal), the first side sound channel signal (herein regarded as a left front sound channel signal), the second side sound channel signal (herein regarded as a left sound channel signal), the third side sound channel signal (herein regarded as a right front sound channel signal), and the fourth side sound channel signal (herein regarded as a right sound channel signal), and synthesize these sound signals into the stereo signal with five sound channels, which is transmitted to the display apparatus **10** for playback (e.g., played through built-in or external speaker devices of the display apparatus **10**), thereby providing a corresponding five-channel stereo effect when the user operates the display apparatus **10** to play multimedia content. Thus, the present invention can greatly enhance the user's audio-visual experience when watching multimedia content played on spliced display devices.

[0023] In practical applications, the present invention could also adopt a sound reception control method that simultaneously turns on multiple sound reception units on the display device to

integrate a single-channel sound signal. For example, the sound reception processor **18** could simultaneously turn on the two first sound reception units **20** on the first display device **12** to receive sound in the first normal direction N**1**, thereby integrating sound signals from the left and right sides of the first display device **12** to generate the first directional sound signal with one single sound channel and corresponding to a front of the display apparatus **10**. At the same time, the sound reception processor **18** could simultaneously turn on the two second sound reception units **22** on the second display device **14** to receive sound in the second normal direction N**2**, thereby integrating sound signals from the left and right sides of the second display device **14** to generate the second directional sound signal with one single sound channel and corresponding to a left side of the display apparatus **10**. Similarly, the sound reception processor **18** could simultaneously turn on the two third sound reception units **24** on the third display device **16** to receive sound in the third normal direction N**3**, thereby integrating sound signals from the left and right sides of the third display device **16** to generate the third directional sound signal with one single sound channel and corresponding to a right side of the display apparatus **10**. Next, the sound reception processor **18** could receive the first directional sound signal corresponding to the front sound channel, the second directional sound signal corresponding to the left sound channel, and the third directional sound signal corresponding to the right sound channel, and synthesize these sound signals into the stereo signal with three sound channels, which is transmitted to the display apparatus **10** for playback, thereby providing a corresponding three-channel stereo effect when the user operates the display apparatus **10** to play multimedia content.

[0024] In addition to the embodiment that can provide the stereo effect with three or more sound channels, the present invention could also adopt a sound reception control method that turns off the first sound reception units **20** of the first display device **12** to provide a two-channel stereo effect. For example, the sound reception processor **18** could turn off both first sound reception units **20** on the first display device **12**, and turn on the second sound reception unit **22** on the second display device **14** that is relatively far from the first display device **12** (i.e., the second sound reception unit **22** on the leftmost side of the second display device **14**), so that the second sound reception unit **22** could receive sound in the second normal direction N**2**, thereby generating the second directional sound signal with a relatively large phase difference/sound pressure difference and corresponding to the left sound channel of the display apparatus **10**. Similarly, the sound reception processor **18** could turn on the third sound reception unit **24** on the third display device **16** that is relatively far from the first display device **12** (i.e., the third sound reception unit **24** on the rightmost side of the third display device **16**), so that the third sound reception unit **24** could receive sound in the third normal direction N**3**, thereby generating the third directional sound signal with a relatively large phase difference/sound pressure difference and corresponding to the right sound channel of the display apparatus **10**. Next, the sound reception processor **18** could receive the second directional sound signal and the third directional sound signal, which respectively correspond to the left sound channel and the right sound channel, and synthesize these directional sound signals into a corresponding two-channel stereo signal, which is transmitted to the display apparatus **10** for playback, thereby providing a corresponding two-channel stereo effect when the user operates the display apparatus **10** to play multimedia content.

[0025] Furthermore, the present invention could also adopt a curved screen connection design. For example, please refer to FIG. **3**, which is a diagram of a display apparatus **100** according to another embodiment of the present invention. Components both mentioned in this embodiment and the aforesaid embodiments represent components with the same or similar structures and functions, and the related description is omitted herein. As shown in FIG. **3**, the display apparatus **100** includes a first display device **102**, a second display device **104**, at least one third display device **106** (one shown in FIG. **3**, but not limited thereto, meaning that the connection number of screens depends on the actual application needs of the display apparatus **100**), and the sound reception processor **18**, thereby constructing a wide curved screen display device formed by three display

devices side by side. Additionally, the related description for the screen connection design of the display apparatus **100** is commonly seen in the prior art and omitted herein.

[0026] The first display device **102** is provided with at least two first sound reception units **20**. The second display device **104** is connected to one side of the first display device **102** and is provided with at least two second sound reception units **22**. The third display device **106** is connected to another side of the first display device **102** and is provided with at least two third sound reception units **24**. The first display device **102**, the second display device **104**, and the third display device **106** could be preferably curved LCD screens (e.g., curved TFT screens, curved OLED screens, or curved micro LED screens, but not limited thereto). Via the aforesaid curved screen connection design, the present invention can utilize curvatures of the first display device **102**, the second display device **104**, and the third display device **106** to expand the overall screen surround range of the display apparatus **100** (for example, the display apparatus **100** could be expanded to have a screen surround range of −90 degrees to 90 degrees relative to the first display device **102**, but not limited thereto), thereby further enhancing the audio-visual surround effect of the display apparatus **100**. As for other related description for this embodiment (e.g., the sound reception control method of the display apparatus **100**), it could be reasoned by analogy according to the aforesaid embodiments and omitted herein.

[0027] To be noted, the present invention could also adopt a dual screen connection configuration to simplify the screen connection design of the display apparatus. In brief, the display apparatus could include only the first display device **12**, the second display device **14**, and the sound reception processor **18** to construct a wide-screen display device formed by two display devices side by side. Via the aforesaid design, the sound reception processor **18** could turn on at least one of the first sound reception units **20** (e.g., the first sound reception unit **20** of the first display device **12** that is relatively far from the second display device **14**, but not limited thereto), to receive sound in the first normal direction N**1** and generate the first directional sound signal. At the same time, the sound reception processor **18** could turn on at least one of the second sound reception units **22** (e.g., the second sound reception unit **22** of the second display device **14** that is relatively far from the first display device **12**, but not limited thereto), to receive sound in the second normal direction N**2** and generate the second directional sound signal. In such a manner, the sound reception processor **18** could receive the first directional sound signal (herein regarded as a right sound channel signal) and the second directional sound signal (herein regarded as a left sound channel signal) to generate a corresponding two-channel stereo signal, allowing the display apparatus to provide a two-channel stereo effect.

[0028] Those skilled in the art will readily observe that numerous modifications and alterations of the device and method may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

Claims

1. A display apparatus comprising: a first display device having at least two first sound reception units; a second display device connected to a side of the first display device and having at least two second sound reception units; and a sound reception processor electrically connected to the at least two first sound reception units and the at least two second sound reception units, the sound reception processor turning on at least one of the at least two first sound reception units to receive sound in a first normal direction of the first display device to generate a first directional sound signal, turning on at least one of the at least two second sound reception units to receive sound in a second normal direction of the second display device to generate a second directional sound signal, and generating a stereo signal according to the first directional sound signal and the second directional sound signal.

2. The display apparatus of claim 1, wherein the sound reception processor turns on the first sound reception unit of the first display device that is far from the second display device and turns on the second sound reception unit of the second display device that is far from the first display device for respectively generating the first directional sound signal and the second directional sound signal.
3. The display apparatus of claim 1, wherein the display apparatus further comprises at least one third display device, the at least one third display device is connected to another side of the first display device and has at least two third sound reception units, the sound reception processor is electrically connected to the at least two third sound reception units, turns on at least one of the at least two third sound reception units to receive sound in a third normal direction of the third display device to generate a third directional sound signal, and the sound reception processor generates the stereo signal according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.
4. The display apparatus of claim 3, wherein the sound reception processor is further used to turn off the two first sound reception units, turn on the second sound reception unit of the second display device that is far from the first display device, and turn on the third sound reception unit of the third display device that is far from the first display device for respectively generating the second directional sound signal and the third directional sound signal; the sound reception processor generates the stereo signal with two sound channels according to the second directional sound signal and the third directional sound signal.
5. The display apparatus of claim 3, wherein the sound reception processor turns on the second sound reception unit of the second display device that is far from the first display device and turns on the third sound reception unit of the third display device that is far from the first display device for respectively generating the second directional sound signal and the third directional sound signal; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.
6. The display apparatus of claim 3, wherein the sound reception processor simultaneously turns on the at least two second sound reception units to generate the second directional sound signal, the second directional sound signal comprises a first side channel signal and a second side channel signal with different phase differences; the sound reception processor simultaneously turns on the at least two third sound reception units to generate the third directional sound signal, the third directional sound signal comprises a third side channel signal and a fourth side channel signal with different phase differences; the sound reception processor generates the stereo signal with five sound channels according to the first directional sound signal, the first side channel signal, the second side channel signal, the third side channel signal, and the fourth side channel signal.
7. The display apparatus of claim 3, wherein the sound reception processor simultaneously turns on the at least two first sound reception units to cooperatively generate the first directional sound signal with one single sound channel, simultaneously turns on the at least two second sound reception units to cooperatively form the second directional sound signal with one single sound channel, and simultaneously turns on the at least two third sound reception units to cooperatively form the third directional sound signal with one single sound channel; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.
8. The display apparatus of claim 3, wherein an angle of connection between the first display device and the second display device and an angle of connection between the first display device and the third display device are less than 180 degrees.
9. The display apparatus of claim 3, wherein at least one of the first display device, the second display device, and the third display device is a curved display screen.
10. The display apparatus of claim 3, wherein the first display device, the second display device, and the third display device are LCD (Liquid Crystal Display) screens, and the at least two first

sound reception units, the at least two second sound reception units, and the at least two third sound reception units are microphones; the sound reception processor turns on the first sound reception unit of the first display device that is close to the second display device or the third display device, and turns on the second sound reception unit of the second display device that is far from the first display device and the third sound reception unit of the third display device that is far from the first display device; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.

11. A sound reception control method for a display apparatus, the display apparatus comprising a first display device and a second display device, the first display device having at least two first sound reception units, the second display device being connected to a side of the first display device and having at least two second sound reception units, the sound reception control method comprising: a sound reception processor turning on at least one of the at least two first sound reception units to receive sound in a first normal direction of the first display device to generate a first directional sound signal; the sound reception processor turning on at least one of the at least two second sound reception units to receive sound in a second normal direction of the second display device to generate a second directional sound signal; and the sound reception processor generating a stereo signal according to the first directional sound signal and the second directional sound signal.

12. The sound reception control method of claim 11, wherein the sound reception processor turns on the first sound reception unit of the first display device that is far from the second display device and turns on the second sound reception unit of the second display device that is far from the first display device for respectively generating the first directional sound signal and the second directional sound signal.

13. The sound reception control method of claim 11, wherein the display apparatus further comprises at least one third display device, the at least one third display device is connected to another side of the first display device and has at least two third sound reception units, and the sound reception control method further comprises: the sound reception processor turns on at least one of the at least two third sound reception units to receive sound in a third normal direction of the third display device to generate a third directional sound signal; and the sound reception processor generates the stereo signal according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.

14. The sound reception control method of claim 13, wherein the sound reception processor is further used to turn off the two first sound reception units, turn on the second sound reception unit of the second display device that is far from the first display device, and turn on the third sound reception unit of the third display device that is far from the first display device for respectively generating the second directional sound signal and the third directional sound signal; the sound reception processor generates the stereo signal with two sound channels according to the second directional sound signal and the third directional sound signal.

15. The sound reception control method of claim 13, wherein the sound reception processor turns on the second sound reception unit of the second display device that is far from the first display device and turns on the third sound reception unit of the third display device that is far from the first display device for respectively generating the second directional sound signal and the third directional sound signal; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.

16. The sound reception control method of claim 13, wherein the sound reception processor simultaneously turns on the at least two second sound reception units to generate the second directional sound signal, the second directional sound signal comprises a first side channel signal and a second side channel signal with different phase differences; the sound reception processor

simultaneously turns on the at least two third sound reception units to generate the third directional sound signal, the third directional sound signal comprises a third side channel signal and a fourth side channel signal with different phase differences; the sound reception processor generates the stereo signal with five sound channels according to the first directional sound signal, the first side channel signal, the second side channel signal, the third side channel signal, and the fourth side channel signal.

17. The sound reception control method of claim 13, wherein the sound reception processor simultaneously turns on the at least two first sound reception units to cooperatively generate the first directional sound signal with one single sound channel, simultaneously turns on the at least two second sound reception units to cooperatively form the second directional sound signal with one single sound channel, and simultaneously turns on the at least two third sound reception units to cooperatively form the third directional sound signal with one single sound channel; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.

18. The sound reception control method of claim 13, wherein an angle of connection between the first display device and the second display device and an angle of connection between the first display device and the third display device are less than 180 degrees.

19. The sound reception control method of claim 13, wherein at least one of the first display device, the second display device, and the third display device is a curved display screen.

20. The sound reception control method of claim 13, wherein the first display device, the second display device, and the third display device are LCD screens, and the at least two first sound reception units, the at least two second sound reception units, and the at least two third sound reception units are microphones; the sound reception processor turns on the first sound reception unit of the first display device that is close to the second display device or the third display device, and turns on the second sound reception unit of the second display device that is far from the first display device and the third sound reception unit of the third display device that is far from the first display device; the sound reception processor generates the stereo signal with three sound channels according to the first directional sound signal, the second directional sound signal, and the third directional sound signal.