US 20130241648A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0241648 A1

(43) Pub. Date: Sep. 19, 2013

Lo et al.

(54) **DRIVING CIRCUIT, OPERATIONAL AMPLIFIER, AND DATA TRANSMITTING METHOD THEREOF**

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(21) Appl. No.: **13/797,413**

(22) Filed: **Mar. 12, 2013**

(30) **Foreign Application Priority Data**

Mar. 13, 2012 (TW) 101108490

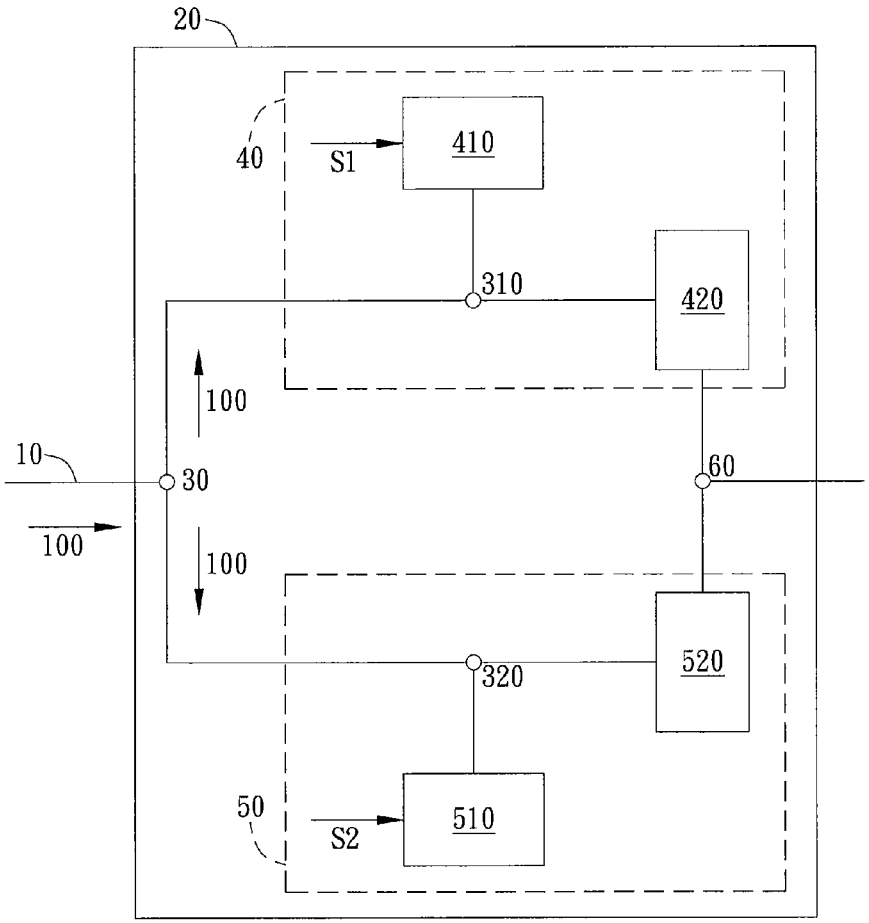
Publication Classification

(51) **Int. Cl.**
H03F 3/45 (2006.01)
H03K 17/06 (2006.01)

(52) **U.S. Cl.**
CPC ***H03F 3/45179*** (2013.01); ***H03K 17/06*** (2013.01)
USPC **330/253**; 327/108

(57) **ABSTRACT**

A data transmitting method is provided, wherein an operational amplifier is coupled with a channel and includes a positive switch, a negative switch, and a coupling end; the positive switch includes a positive control unit and a positive switch unit; the negative switch includes a negative control unit and a negative switch unit. The data transmitting method includes: transmitting an analog data to a first node and a second node from the coupling end; and by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit.



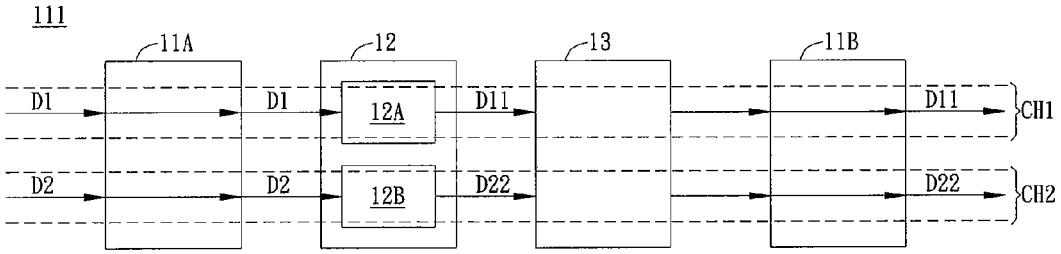


FIG. 1A (PRIOR ART)

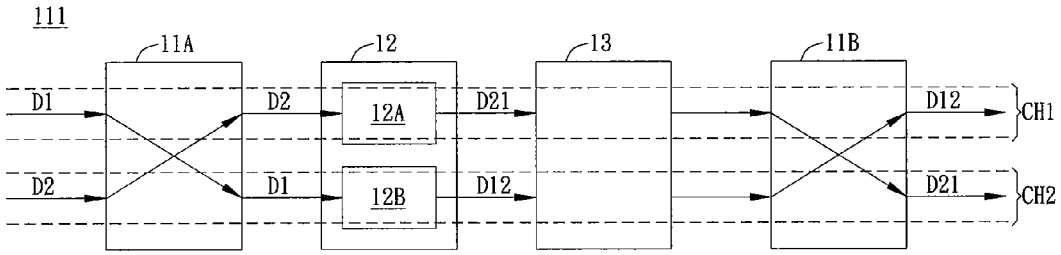


FIG. 1B (PRIOR ART)

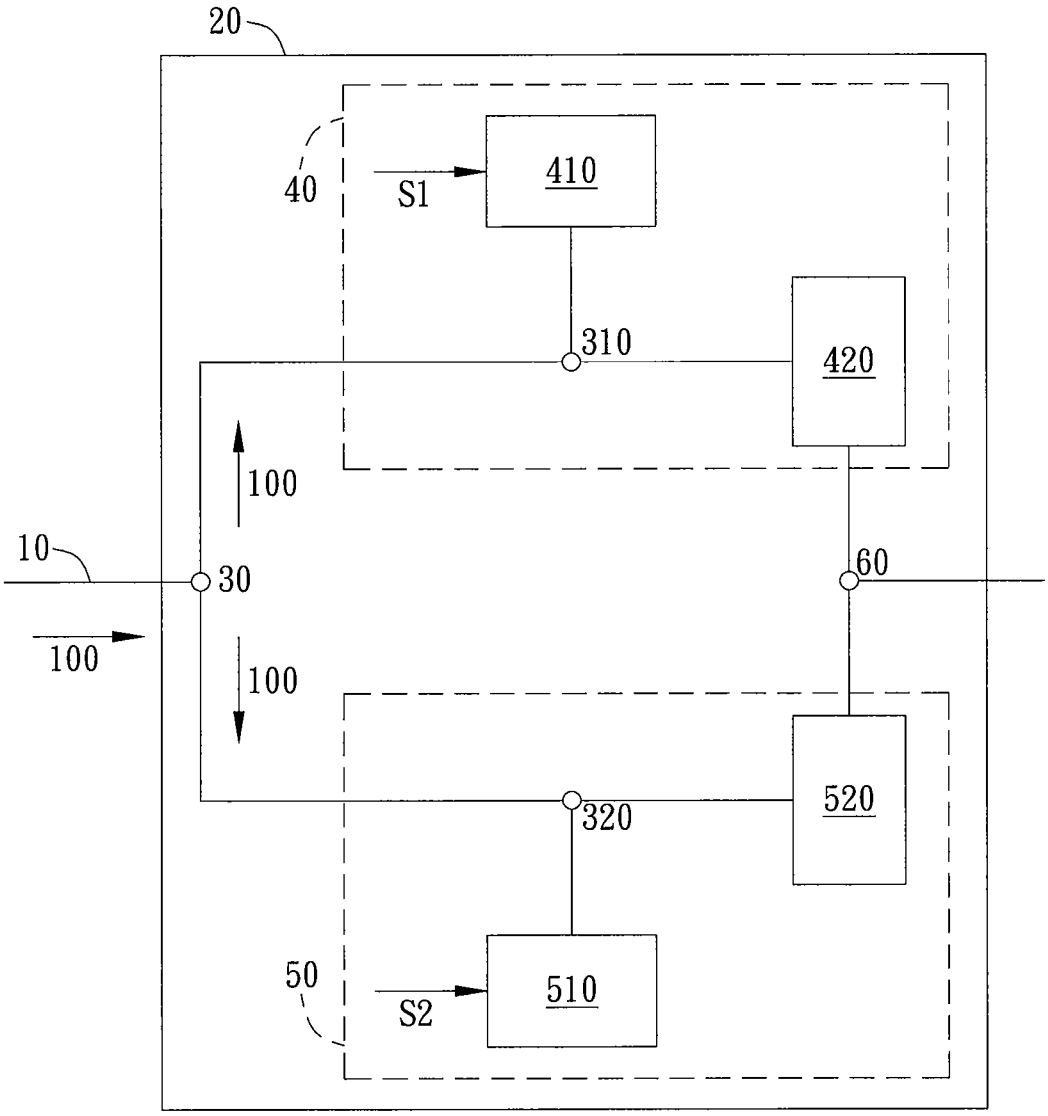


FIG. 2

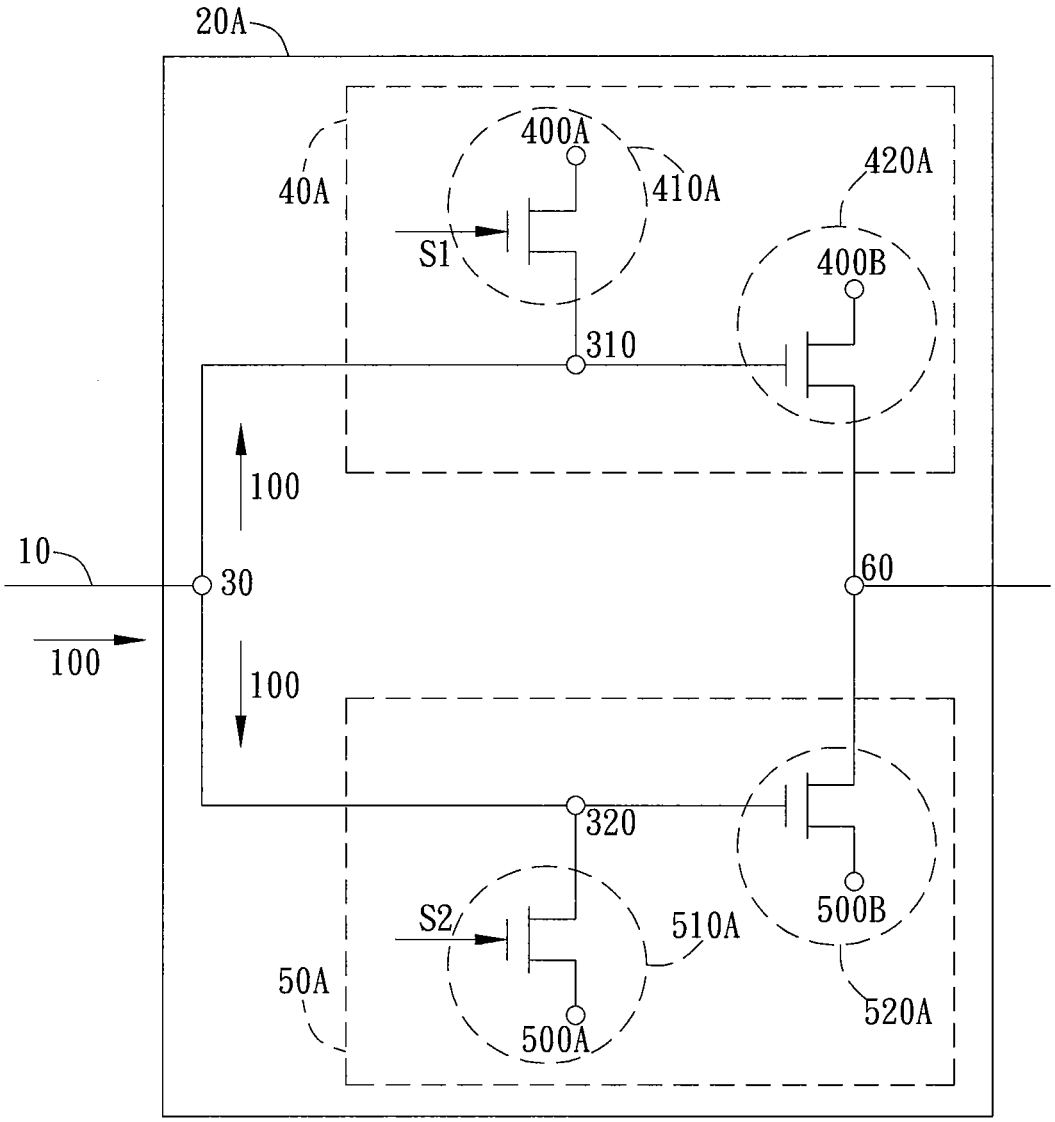

20A
40A
400A
410A
S1
420A
400B
310
100
10
30
60
100
100
320
S2
510A
500B
50A
500A
520A

FIG. 3

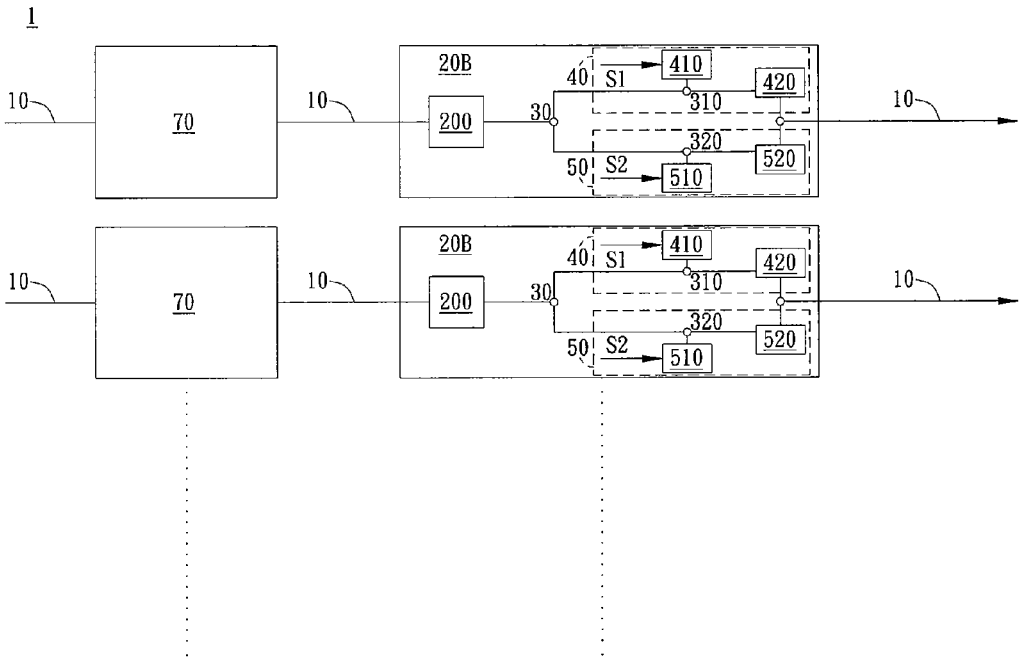

1
10
70
10
20B
200
30
40
S1
410
420
310
320
520
50
S2
510
10
10
70
10
20B
200
30
40
S1
410
420
310
320
520
50
S2
510
10

FIG. 4

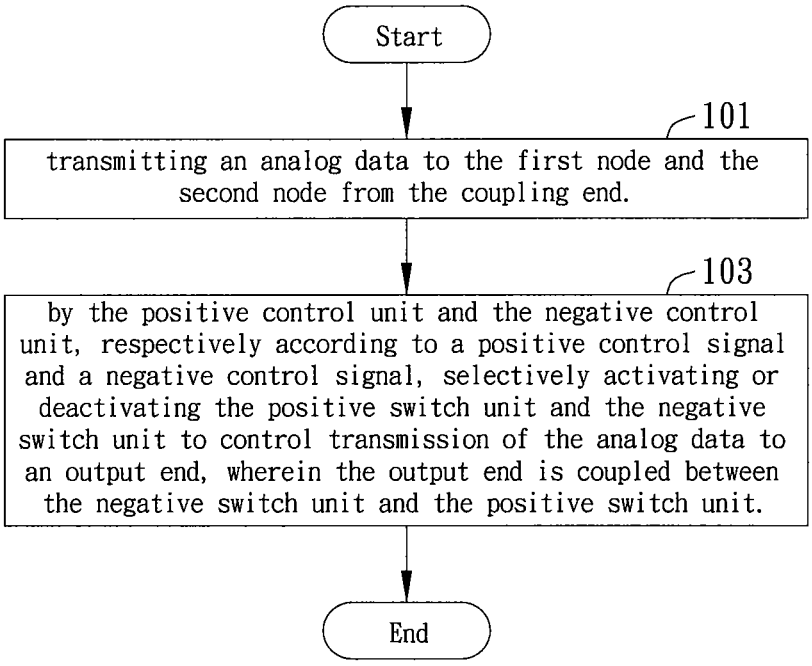

Start
101
transmitting an analog data to the first node and the second node from the coupling end.
103
by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit.
End

FIG. 5

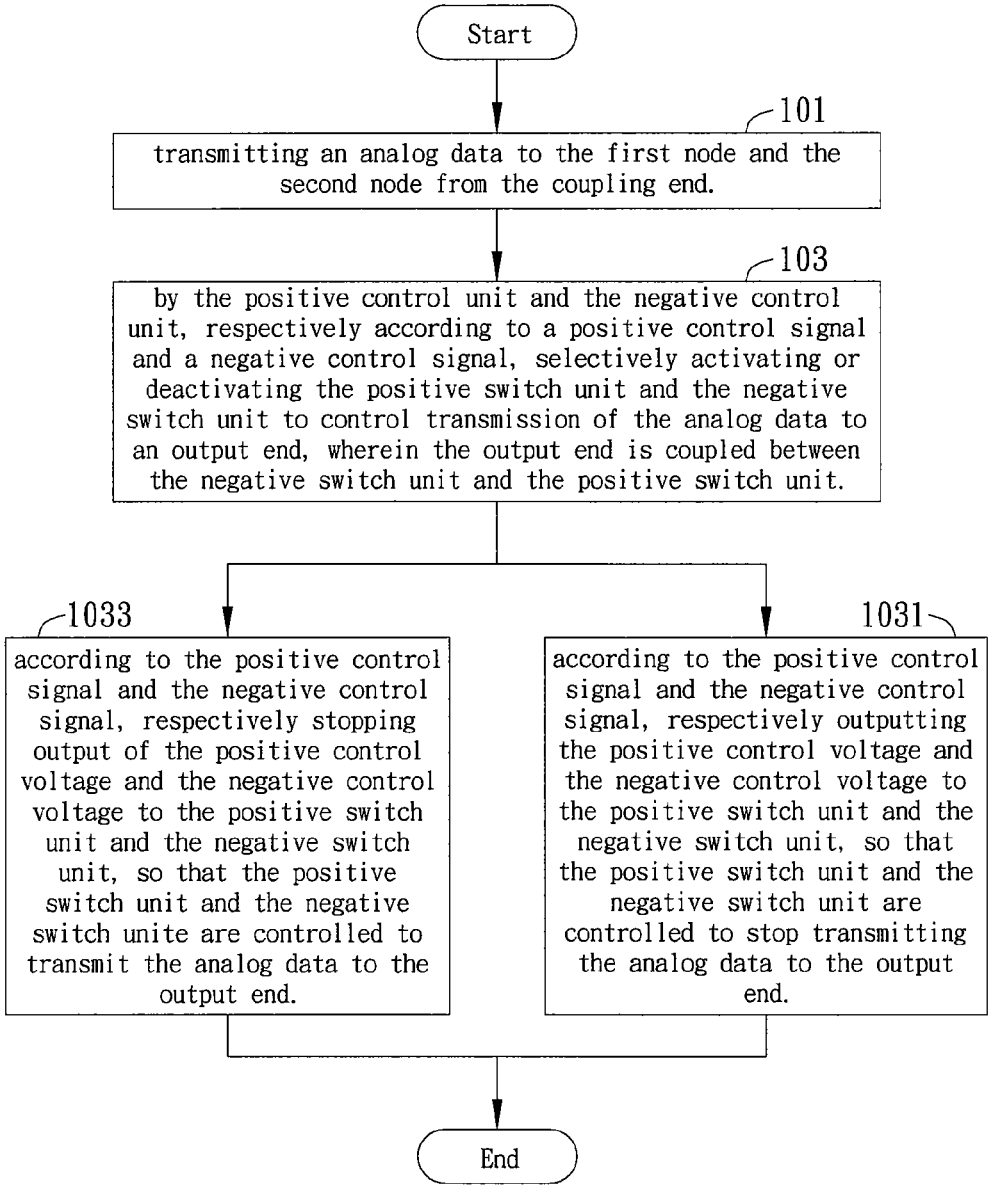

Start
101
transmitting an analog data to the first node and the second node from the coupling end.
103
by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit.
1033
according to the positive control signal and the negative control signal, respectively stopping output of the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unite are controlled to transmit the analog data to the output end.
1031
according to the positive control signal and the negative control signal, respectively outputting the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unit are controlled to stop transmitting the analog data to the output end.
End

FIG. 6

DRIVING CIRCUIT, OPERATIONAL AMPLIFIER, AND DATA TRANSMITTING METHOD THEREOF

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates generally to a driving circuit, an operational amplifier, and a data transmitting method; particularly, the present invention relates to a driving circuit, an operational amplifier, and a data transmitting method used in a display device.

[0003] 2. Description of the Related Art

[0004] In general, the conventional display device includes a front-end circuit and a back-end circuit, wherein the front-end circuit processes digital data, and the back-end circuit converts the digital data into analog data and transmits the analog data to the panel to display images. Generally, the operation voltage range of the digital data is between 2.5 V and 3.5 V, which is low voltage. However, the operation voltage range of the analog data is between 0 V and 15 V, which is high voltage. In practical applications, the conventional display device utilizes the back-end circuit to convert the digital data.

[0005] Please refer to FIG. **1**A; FIG. **1**A is a schematic view of the back-end circuit of the conventional LCD device. As shown in FIG. **1**A, a back-end circuit **111** includes a low voltage switch **11**A, a digital/analog conversion module **12**, an operational amplifier **13**, a high voltage switch **11**B, a first channel CH**1**, and a second channel CH**2**, wherein the digital/analog conversion module **12** includes a negative conversion unit **12**A and a positive conversion unit **12**B which are respectively disposed in the first channel CH**1** and the second channel CH**2**.

[0006] It is noted that the operation voltage range of the first digital data D**1** and the second digital data D**2** is around 3V to 3.3 V, and the first digital data D**1** and the second digital data D**2** are respectively transmitted in the first channel CH**1** and the second channel CH**2**. In practical applications, the first digital data D**1** and the second digital data D**2** are respectively transmitted to the digital/analog conversion module **12** by the low voltage switch **11**A, and the negative conversion unit **12**A and the positive conversion unit **12**B respectively convert the first digital data D**1** and the second digital data D**2** into the first negative analog data D**11** and the second positive analog data D**22**. The operational amplifier **13** respectively operates the first negative analog data D**11** and the second positive analog data D**22** in the first channel CH**1** and the second channel CH**2** and outputs the operated data to the high voltage switch **11**B.

[0007] Please refer to FIG. **1**B; FIG. **1**B is a schematic view of the back-end circuit of the conventional LCD device. As shown in FIG. **1**B, the first digital data D**1** and the second digital data D**2** are respectively transmitted in the first channel CH**1** and the second channel CH**2** and are switched to the second channel CH**2** and the first channel CH**1** by the low voltage switch **11**A. In addition, the second digital data D**2** and the first digital data D**1** are converted into the second negative analog data D**21** and the first positive analog data D**12** by the negative conversion unit **12**A and the positive conversion unit **12**B. It is noted that the second negative analog data D**21** and the first positive analog data D**12** are respectively transmitted to the operational amplifier **13** for operation. The operated second negative analog data D**21** and first positive analog data D**12** are respectively transmitted to the high voltage switch **11**B. It is noted that the second negative analog data D**21** and the first positive analog data D**12** are respectively switched to the second channel CH**2** and the first channel CH**1** by the high voltage switch **11**B.

[0008] As shown in FIGS. **1**A and **1**B, the end of the first channel CH**1** has a first negative analog data D**11** and a first positive analog data D**12**, and the end of the second channel CH**2** has a second positive analog data D**22** and a second negative analog data D**21**, so that the first channel CH**1** and the second channel CH**2** can operate the analog data.

[0009] In practical applications, when researchers and developers design the back-end circuit **10**, the low voltage switch **11**A and the high voltage switch **11**B have to be disposed in each channel to transmit the digital data or the analog data to the assigned channel. Particularly, the conventional display device utilizes the low voltage switch **11**A and the high voltage switch **11**B to switch the data respectively, so that each channel can operate corresponding positive analog data and negative analog data. It is desired to decrease the volume and the area of the conventional display device to produce small-size products. However, the low voltage switch **11**A and the high voltage switch **11**B have fixed volumes; it is hard to decrease the volume of the device effectively.

SUMMARY OF THE INVENTION

[0010] In view of prior arts, the present invention provides a driving circuit, an operational amplifier, and a data transmitting method, which can effectively decrease the cost and the volume.

[0011] It is an object of the present invention to provide an operational amplifier, which compares the voltages and has high impedance.

[0012] It is an object of the present invention to provide a driving circuit, which decreases the amount of the voltage switches to decrease the cost of materials.

[0013] It is an object of the present invention to provide a data transmitting method, which utilizes control signals to control the analog data.

[0014] According to an embodiment of the present invention, an operational amplifier is provided, wherein the operational amplifier is connected to a channel. The operational amplifier includes a coupling end, a positive switch, a negative switch, and an output end, wherein the coupling end coupled with a first node and a second node, and an analog data is transmitted from the coupling end to the first node and the second node. The positive switch includes a positive control unit and a positive switch unit, and the first node is coupled with the coupling end and the positive switch unit, wherein the positive control unit is connected to the first node. In addition, the negative switch includes a negative control unit and a negative switch unit, wherein the second node is coupled with the coupling end and the negative switch unit, and the negative control unit is connected to the second node. The output end is coupled between the negative switch unit and the positive switch unit. The positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activate or deactivate the positive switch unit and the negative switch unit to control transmission of the analog data to the output end.

[0015] According to another embodiment of the present invention, a driving circuit is provided. The driving circuit includes a plurality of channels and a plurality of operational

amplifiers, wherein one of the operational amplifiers is coupled with one of the channels. The operational amplifier includes a coupling end, a positive switch, a negative switch, and an output end, wherein the coupling end is coupled with a first node and a second node, and an analog data is transmitted from the coupling end to the first node and the second node. The positive switch includes a positive control unit and a positive switch unit, wherein the first node is coupled with the coupling end and the positive switch unit, and the positive control unit is connected to the first node. It is noted that the negative switch includes a negative control unit and a negative switch unit, the second node is coupled with the coupling end and the negative switch unit, and the negative control unit is connected to the second node. The output end is coupled between the negative switch unit and the positive switch unit, wherein the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activate or deactivate the positive switch unit and the negative switch unit to control transmission of the analog data to the output end.

[0016] According to another embodiment of the present invention, a data transmitting method is provided for an operational amplifier, wherein the operational amplifier is coupled with a channel and includes a positive switch, a negative switch, and a coupling end. The coupling end is coupled with a first node and a second node. The positive switch includes a positive control unit and a positive switch unit. The first node is coupled with the coupling end and the positive switch unit. The positive control unit is connected to the first node. The negative switch includes a negative control unit and a negative switch unit. The second node is coupled with the coupling end and the negative switch unit. The negative control unit is connected to the second node. The data transmitting method includes: transmitting an analog data to the first node and the second node from the coupling end; and by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit.

[0017] Compared to prior arts, the driving circuit, the operational amplifier, and the data transmitting method of the present invention respectively control the positive control unit and the negative control unit of the operational amplifier according to the positive control signal and the negative control signal, so that the positive switch unit and the negative switch unit can control whether the analog data is transmitted to the output end or not, further achieving the effect of the conventional high voltage switch. Hence, the embodiments of the present invention only utilize operational amplifiers of different design to control the analog data, eliminating the use of high voltage switches of the conventional display device and further decreasing the cost and the area of the chip.

[0018] The detailed descriptions and the drawings thereof below provide further understanding about the advantage and the spirit of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] So that the manner in which the above recited features of the present invention can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

[0020] FIG. **1**A is a schematic view of the back-end circuit of the conventional LCD device;

[0021] FIG. **1**B is a schematic view of the back-end circuit of the conventional LCD device;

[0022] FIG. **2** is a schematic view of the embodiment of an operational amplifier of the present invention;

[0023] FIG. **3** is a schematic view of another embodiment of the operational amplifier of the present invention;

[0024] FIG. **4** is a schematic view of the embodiment of the driving circuit of the present invention;

[0025] FIG. **5** is a flow chart of a data transmitting method of the present invention; and

[0026] FIG. **6** is a flow chart of the data transmitting method of the present invention.

DETAILED DESCRIPTION

[0027] According to an embodiment of the present invention, an operational amplifier is provided. In the embodiment, the operational amplifier is used in a driving circuit, especially a source driver circuit of an LCD device, but is not limited to the embodiment.

[0028] Please refer to FIG. **2**; FIG. **2** is a schematic view of the embodiment of an operational amplifier of the present invention. As shown in FIG. **2**, an operational amplifier **20** is connected to a channel **10** and includes a coupling end **30**, a positive switch **40**, a negative switch **50**, and an output end **60**, wherein the coupling end **30** is coupled with a first node **310** and a second node **320**. It is noted that the channel **10** can be any type of circuit channel and not limited to the embodiment. In the embodiment, the difference between the positive switch **40** and the negative switch **50** is amplitude of the working voltage. For instance, the voltage of the positive switch **40** approaches the operating voltage of the operational amplifier, and the voltage of the negative switch **50** approaches zero potential. However, in other embodiments, the voltage of the positive switch **40** and the negative switch **50** can be controlled by the driving circuit, but not limited to the embodiment.

[0029] It is noted that the positive switch **40** includes a positive control unit **410** and a positive switch unit **420**, wherein the first node **310** is coupled with the coupling end **30** and the positive switch unit **420**, and the positive control unit **410** is connected to the first node **310**. In addition, the negative switch **50** includes a negative control unit **510** and a negative switch unit **520**, wherein the second node **320** is coupled with the coupling end **30** and the negative switch unit **520**, and the negative control unit **510** is connected to the second node **320**.

[0030] It is noted that the output end **60** is coupled between the negative switch unit **520** and the positive switch unit **420**, wherein the positive control unit **410** and the negative control unit **420**, respectively according to a positive control signal S**1** and a negative control signal S**2**, selectively activate or deactivate the positive switch unit **420** and the negative switch unit **520** to control transmission of the analog data **100** to the output end **60**.

[0031] Particularly, the present invention utilizes the positive control signal S**1** and the negative control signal S**2** to respectively control the positive control unit **410** and the

negative control unit **420**, and the positive control unit **410** and the negative control unit **420** respectively output an operated result, so that the positive switch unit **420** and the negative switch unit **520** is driven to be activated or to be deactivated according to the operated result, further determining whether the analog data is transmitted to the output end or not. In other words, the positive control unit **410** and the negative control unit **510** can be any type of control logic circuit, and the positive switch unit **420** and the negative switch unit **520** can be any type of switch component. For instance, the positive control unit **410**A, the positive switch unit **420**A, the negative control unit **510**A, and the negative switch unit **520**A can be transistors or other circuit components, not limited to the embodiment.

[0032] Please refer to FIG. **3**; FIG. **3** is a schematic view of another embodiment of the operational amplifier of the present invention. As shown in FIG. **3**, the operational amplifier **20**A includes the positive switch **40**A and the negative switch **40**B. The positive switch **40**A has a positive control unit **410**A and a positive switch unit **420**A. The negative switch **50**A has a negative control unit **510**A and the negative switch unit **520**A. In the embodiment, the positive control unit **410**A, the positive switch unit **420**A, the negative control unit **510**A, and the negative switch unit **520**A are transistors. The present invention utilizes the operating voltage of the positive control unit **410**A and the negative control unit **510**A and selectively outputs the voltage to the positive switch unit **420**A and the negative switch unit **520**A to control the transmission of the analog data, either for data transmission or stopping the data transmission.

[0033] In practical applications, the positive control unit **410**A and the negative control unit **510**A respectively output a positive control voltage **400**A and a negative control voltage **500**A to the positive switch unit **420**A and the negative switch unit **520**A according to the positive control signal S**1** and the negative control signal S**2**. It is noted that the positive switch unit **420**A and the negative switch unit **520**A respectively have a positive switch voltage **400**B corresponding to the positive control voltage **400**A and a negative switch voltage **500**B corresponding to the negative control voltage **500**A, so that the positive switch unit **420**A and the negative switch unit **520**A are controlled to stop transmitting the analog data **100** to the output end **60**.

[0034] It is noted that the operational amplifier **20**A has the operating voltage. For instance, the range of the operating voltage can be between 0 V and 15 V, but not limited to the embodiment. In the embodiment, the operating voltages of the operational amplifier **20**A, the positive control voltage **400**A, and the positive switch voltage **400**B are identical. In addition, the negative control voltage **500**A and the negative switch voltage **500**B are zero potential. In the embodiment, the negative control unit **510**A and the negative switch unit **520**A are connected to the ground, so that the negative control voltage **500**A and the negative switch voltage **500**B are zero potential.

[0035] In practical applications, the positive switch unit **420**A utilizes the positive control voltage **400**A and the positive switch voltage **400**B, which are identical, as well as the negative control voltage **500**A and the negative switch voltage **500**B, which are identical, to generate open circuit between the positive switch unit **420**A and the negative switch unit **520**A. In other words, when the positive switch unit **420**A and the negative switch unit **520**A respectively receive the positive control voltage **400**A and the negative control voltage **500**A from the positive control unit **410**A and the negative control unit **510**A, the positive switch unit **420**A and the negative switch unit **520**A are at open circuit state, so that the transmission of the analog data **100** to the output end **60** is stopped.

[0036] Relatively, the positive control unit **410**A and the negative control unit **510**A stop outputting the positive control voltage **400**A and the negative control voltage **500**A to the positive switch unit **420**A and the negative switch unit **520**A according to the positive control signal S**1** and the negative control signal S**2**, so that the positive switch unit **420**A and the negative switch unit **520**A are controlled to transmit the analog data **100** to the output end **60**.

[0037] In other words, when the positive switch unit **420**A and the negative switch unit **520**A respectively stop receiving the positive control voltage **400**A and the negative control voltage **500**A from the positive control unit **410**A and the negative control unit **510**A, the positive switch unit **420**A and the negative switch unit **520**A are at conducting state, so that the analog data **100** is transmitted to the output end **60**.

[0038] Hence, the operational amplifier **20**A of the present invention utilizes the positive control signal S**1** and the negative control signal S**2** to control the positive switch **40**A and the negative switch **50**A to determine whether the analog data **100** is transmitted to the output end **60** or not.

[0039] According to another embodiment of the present invention, a driving circuit is provided. In the embodiment, the driving circuit is used in an LCD device to drive an LCD panel, but not limited to the embodiment. In other embodiments, the driving circuit can be used in any type of display device, such as plasma display devices, laser display devices, or other display devices, and not limited the embodiment. In practical applications, the driving circuit can be a source driver circuit of the display panel, but is not limited to the embodiment. In the embodiment, the front-end circuit of the display device has a plurality of even number channels and a plurality of odd number channels, wherein the even number channels and the odd number channels are connected with the source driver circuit of the display panel, so that digital data in the channels is switched by the source driver circuit and is converted into analog data. In other words, the driving circuit is the back-end circuit of the display panel and is used to output the analog data to the display panel to output images.

[0040] Please refer to FIG. **4**; FIG. **4** is a schematic view of the embodiment of the driving circuit **1** of the present invention. As shown in FIG. **4**, the driving circuit **1** includes a plurality of channels **10**, a plurality of operational amplifiers **20**B, and a plurality of digital/analog conversion modules. The operational amplifiers **20**B are coupled with corresponding channels **10**. Each digital/analog conversion module **70** is connected to the operational amplifier **20**B by the channel **10**, and the digital data is converted into the analog data by the digital/analog conversion module **70** and then transmitted to the operational amplifier **20**B.

[0041] It is noted that the digital data and the analog data are transmitted in the driving circuit **1** in form of voltage, wherein a voltage of the digital data is between 2.5 V and 3.5 V; a voltage of the analog data is between 0 V and 15 V, but not limited to the embodiment. In other words, the digital/analog conversion module **70** converts the digital data into an analog data as an analog voltage. In practical applications, low voltage (e.g. 3 V) cannot drive the display panel, so the driving circuit **1** utilizes the analog voltage (e.g. 7.5 V) to drive the display panel. In the embodiment, the digital/analog conver-

sion module **70** is a level shifter and can convert the voltage of the digital data, but not limited to the embodiment.

[0042] With regard to detailed descriptions of the circuit configuration of the operational amplifier **20**B, in addition to the circuit components of the operational amplifier **20** in FIG. **2**, an operating unit **200** is further included. In the embodiment, the operating unit **200** operates and amplifies the analog data, and transmits the analog data to the first node **310** and the second node **320** through the coupling end **30**. In addition, the operational amplifier **20**B controls the positive switch **40** and the negative switch **50** to transmit or to stop transmitting the analog data to the output end **60**. In practical applications, the analog data is transmitted to the display panel to output images on the display panel.

[0043] In addition to the embodiment of the driving circuit **1**, a data transmitting method of the present invention is provided to illustrate the practical operating steps.

[0044] According to another embodiment of the present invention, a data transmitting method is provided to illustrate steps of transmitting the analog data.

[0045] It is noted that the data transmitting method is used in an operational amplifier, wherein the operational amplifier is coupled with a channel and includes a positive switch, a negative switch, and a coupling end. The coupling end is coupled with a first node and a second node. The positive switch includes a positive control unit and a positive switch unit. The first node is coupled with the coupling end and the positive switch unit. The positive control unit is connected to the first node. The negative switch includes a negative control unit and a negative switch unit. The second node is coupled with the coupling end and the negative switch unit. The negative control unit is connected to the second node.

[0046] Please refer to FIG. **5**; FIG. **5** is a flow chart of a data transmitting method of the present invention. Firstly, the data transmitting method executes the step **101**: transmitting an analog data to the first node and the second node from the coupling end. For instance, as shown in FIG. **2**, the analog data **100** is transmitted to the first node **310** and the second node **320** from the coupling end **30**.

[0047] In addition, the data transmitting method executes the step **103**: by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit. As shown in FIG. **2**, the positive control unit **410** and the negative control unit **510**, respectively according to the positive control signal S**1** and the negative control signal S**2**, selectively activate or deactivate the positive switch unit **420** and the negative switch unit **520** to control transmission of the analog data **100** to the output end **60**.

[0048] In addition, in the flow chart of FIG. **5**, the positive control unit and the negative control unit respectively have a positive control voltage and a negative control voltage. The positive switch unit and the negative switch unit respectively have a positive switch voltage corresponding to the positive control voltage and a negative switch voltage corresponding to the negative control voltage. In addition, the positive control voltage and the positive switch voltage are identical. The negative control voltage and the negative switch voltage are zero potential.

[0049] Please refer to FIG. **6**; FIG. **6** is a flow chart of the data transmitting method of the present invention. The data transmitting method further executes the step **1031**: according to the positive control signal and the negative control signal, respectively outputting the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unit are controlled to stop transmitting the analog data to the output end. As shown in FIG. **3**, the positive control unit **410**A and the negative control unit **510**A, according to the positive control signal S**1** and the negative control signal S**2**, respectively output the positive control voltage **400**A and the negative control voltage **500**A to the positive switch unit **420**A and the negative switch unit **520**A, so that the positive switch unit **420**A and the negative switch unit **520**A are controlled to stop transmitting the analog data **100** to the output end **60**.

[0050] The step **1033** includes, according to the positive control signal and the negative control signal, respectively stopping output of the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unite are controlled to transmit the analog data to the output end. As shown in FIG. **3**, the positive control unit **410**A and the negative control unit **510**A, according to the positive control signal S**1** and the negative control signal S**2**, respectively stop output of the positive control voltage **400**A and the negative control voltage **500**A to the positive switch unit **420**A and the negative switch unit **520**A, so that the positive switch unit **420**A and the negative switch unit **520**A are controlled to transmit the analog data **100** to the output end **60**.

[0051] Hence, the present invention utilizes the positive control signal S**1**, the negative control signal S**2**, the positive switch **40**, and the negative switch **50** to control transmission of the analog data **100** rather than disposing the high voltage switch, further decreasing the cost of material and the area of the chip.

[0052] Compared to prior arts, the driving circuit, the operational amplifier, and the data transmitting method of the present invention respectively control the positive control unit and the negative control unit of the operational amplifier according to the positive control signal and the negative control signal, so that the positive switch unit and the negative switch unit can control whether the analog data is transmitted to the output end or not, achieving the effect of the conventional high voltage switch. Hence, the embodiments of the present invention only utilize operational amplifiers of different design to control the analog data, eliminating the use of high voltage switches of the conventional display device and further decreasing the cost and the area of the chip.

[0053] Although the preferred embodiments of the present invention have been described herein, the above description is merely illustrative. Further modification of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

1. A driving circuit, comprising:

a plurality of channels; and

a plurality of operational amplifiers, wherein one of the operational amplifiers is coupled with one of the channels and comprises:

a coupling end coupled with a first node and a second node, wherein an analog data is transmitted from the coupling end to the first node and the second node;

a positive switch comprising a positive control unit and a positive switch unit, wherein the first node is coupled with the coupling end and the positive switch unit, and the positive control unit is connected to the first node;

a negative switch comprising a negative control unit and a negative switch unit, wherein the second node is coupled with the coupling end and the negative switch unit, and the negative control unit is connected to the second node; and

an output end coupled between the negative switch unit and the positive switch unit, wherein the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activate or deactivate the positive switch unit and the negative switch unit to control transmission of the analog data to the output end.

2. The driving circuit of claim **1**, wherein the positive control unit and the negative control unit respectively output a positive control voltage and a negative control voltage to the positive switch unit and the negative switch unit according to the positive control signal and the negative control signal, and the positive switch unit and the negative switch unit respectively have a positive switch voltage corresponding to the positive control voltage and a negative switch voltage corresponding to the negative control voltage, so that the positive switch unit and the negative switch unit are controlled to stop transmitting the analog data to the output end.

3. The driving circuit of claim **2**, wherein the positive control unit and the negative control unit stop outputting the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit according to the positive control signal and the negative control signal, so that the positive switch unit and the negative switch unit are controlled to transmit the analog data to the output end.

4. The driving circuit of claim **2**, wherein the positive control voltage and the positive switch voltage are identical.

5. The driving circuit of claim **2**, wherein the negative control voltage and the negative switch voltage are zero potential.

6. An operational amplifier connected to a channel, the operational amplifier comprising:

a coupling end coupled with a first node and a second node, wherein an analog data is transmitted from the coupling end to the first node and the second node;

a positive switch comprising a positive control unit and a positive switch unit, wherein the first node is coupled with the coupling end and the positive switch unit, and the positive control unit is connected to the first node;

a negative switch comprising a negative control unit and a negative switch unit, wherein the second node is coupled with the coupling end and the negative switch unit, and the negative control unit is connected to the second node; and

an output end coupled between the negative switch unit and the positive switch unit, wherein the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activate or deactivate the positive switch unit and the negative switch unit to control transmission of the analog data transmitting to the output end.

7. The operational amplifier of claim **6**, wherein the positive control unit and the negative control unit respectively output a positive control voltage and a negative control voltage to the positive switch unit and the negative switch unit according to the positive control signal and the negative control signal, and the positive switch unit and the negative switch unit respectively have a positive switch voltage corresponding to the positive control voltage and a negative switch voltage corresponding to the negative control voltage, so that the positive switch unit and the negative switch unit are controlled to stop transmitting the analog data to the output end.

8. The operational amplifier of claim **7**, wherein the positive control unit and the negative control unit stop outputting the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit according to the positive control signal and the negative control signal, so that the positive switch unit and the negative switch unit are controlled to transmit the analog data to the output end.

9. The operational amplifier of claim **7**, wherein the positive control voltage and the positive switch voltage are identical.

10. The operational amplifier of claim **7**, wherein the negative control voltage and the negative switch voltage are zero potential.

11. A data transmitting method used in an operational amplifier, wherein the operational amplifier is coupled with a channel and comprises a positive switch, a negative switch, and a coupling end, the coupling end is coupled with a first node and a second node, the positive switch comprises a positive control unit and a positive switch unit, and the first node is coupled with the coupling end and the positive switch unit, the positive control unit is connected to the first node; the negative switch comprises a negative control unit and a negative switch unit, and the second node is coupled with the coupling end and the negative switch unit, the negative control unit is connected to the second node, the data transmitting method comprising:

(a) transmitting an analog data to the first node and the second node from the coupling end; and

(b) by the positive control unit and the negative control unit, respectively according to a positive control signal and a negative control signal, selectively activating or deactivating the positive switch unit and the negative switch unit to control transmission of the analog data to an output end, wherein the output end is coupled between the negative switch unit and the positive switch unit.

12. The data transmitting method of claim **11**, wherein the positive control unit and the negative control unit respectively have a positive control voltage and a negative control voltage, and the positive switch unit and the negative switch unit respectively have a positive switch voltage corresponding to the positive control voltage and a negative switch voltage corresponding to the negative control voltage, the data transmitting method further comprises:

according to the positive control signal and the negative control signal, respectively outputting the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unit are controlled to stop transmitting the analog data to the output end.

13. The data transmitting method of claim **12**, further comprising:

according to the positive control signal and the negative control signal, respectively stopping output of the positive control voltage and the negative control voltage to the positive switch unit and the negative switch unit, so that the positive switch unit and the negative switch unit are controlled to transmit the analog data to the output end.

14. The data transmitting method of claim **12**, wherein the positive control voltage and the positive switch voltage are identical.

15. The data transmitting method of claim **12**, wherein the negative control voltage and the negative switch voltage are zero potential.

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