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(54) **LIQUID CRYSTAL DISPLAY PANEL AND DRIVING METHOD THEREOF**

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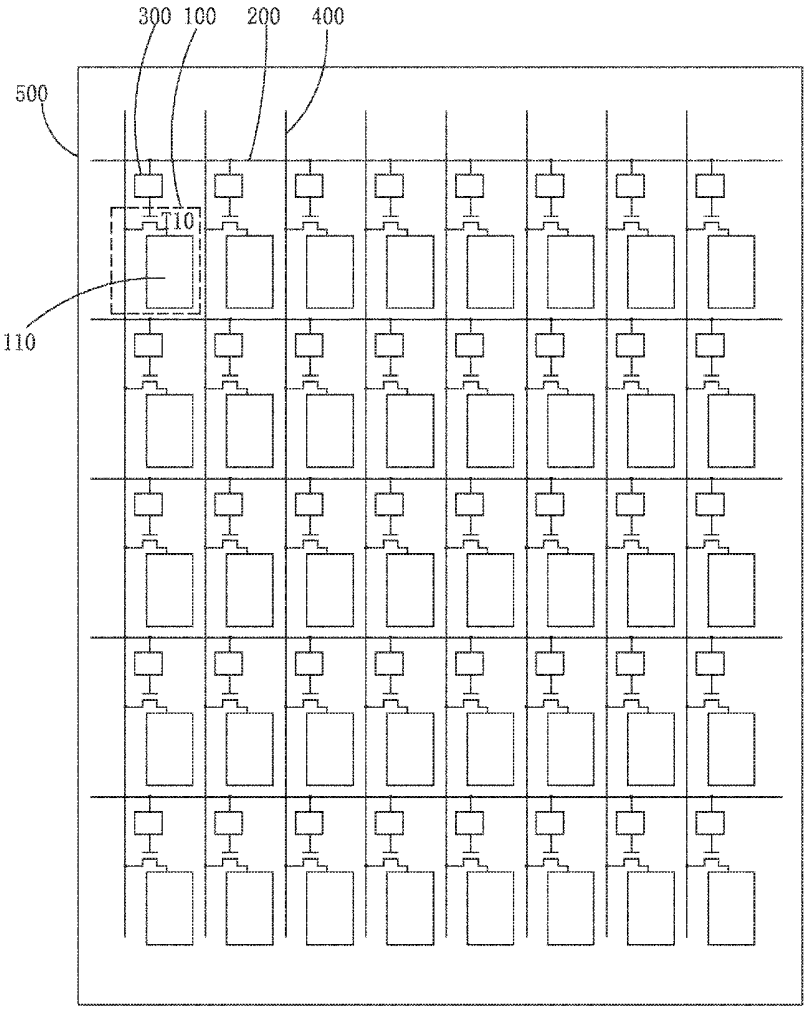
(57) **ABSTRACT**

Provided are a LCD panel and a driving method thereof. The LCD panel includes pixels, scanning lines and input modules. In one of any two adjacent frame periods, the first switching unit connects the first end thereof to the second end thereof to connect the non-inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the second end thereof to connect the inverting end of the operational amplifier to the output end. In the other of any two adjacent frame periods, the first switching unit connects the first end thereof to the third end thereof to connect the inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the first end thereof to connect the non-inverting end of the operational amplifier to the output end.



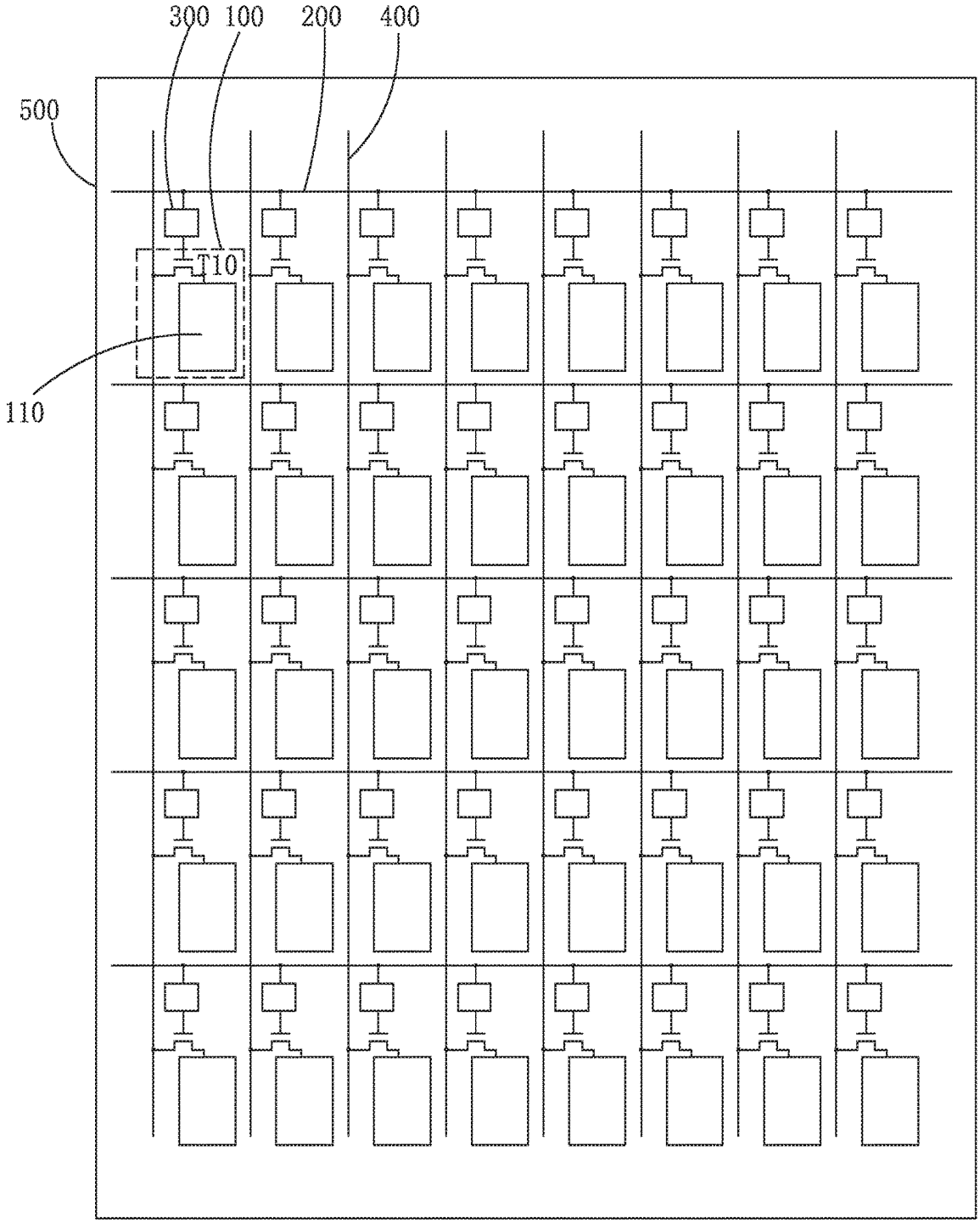


FIG. 1

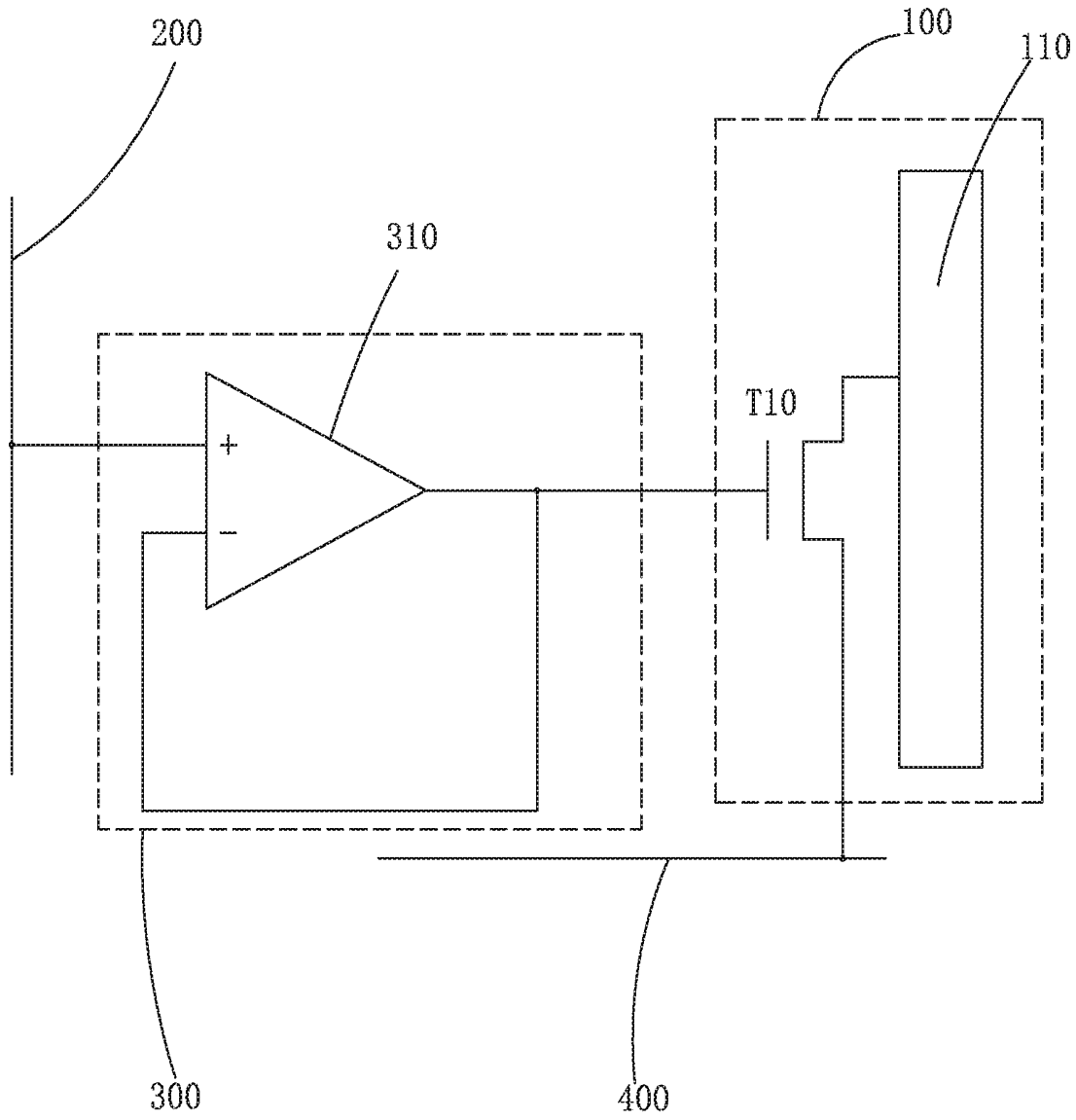


FIG. 2

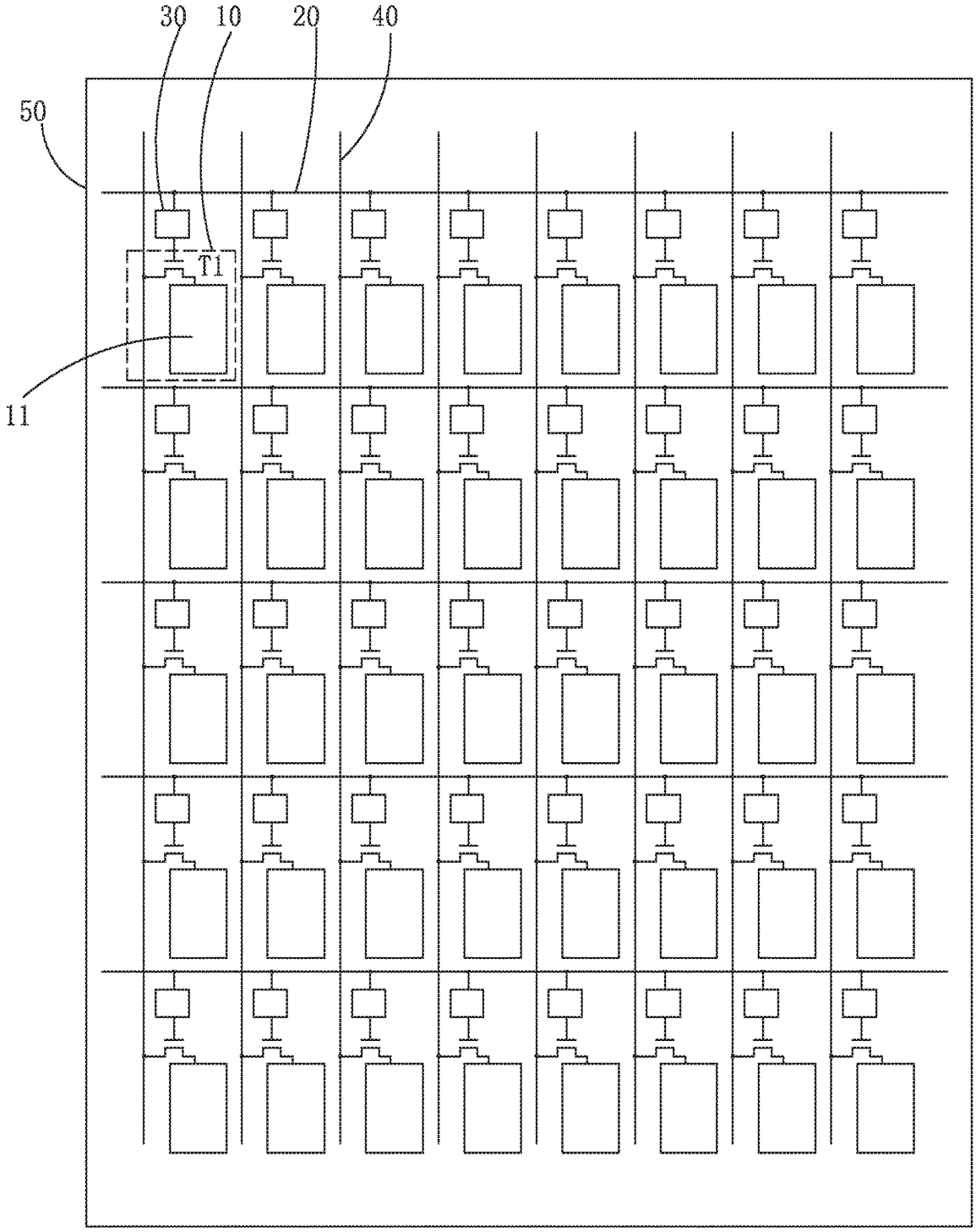


FIG. 3

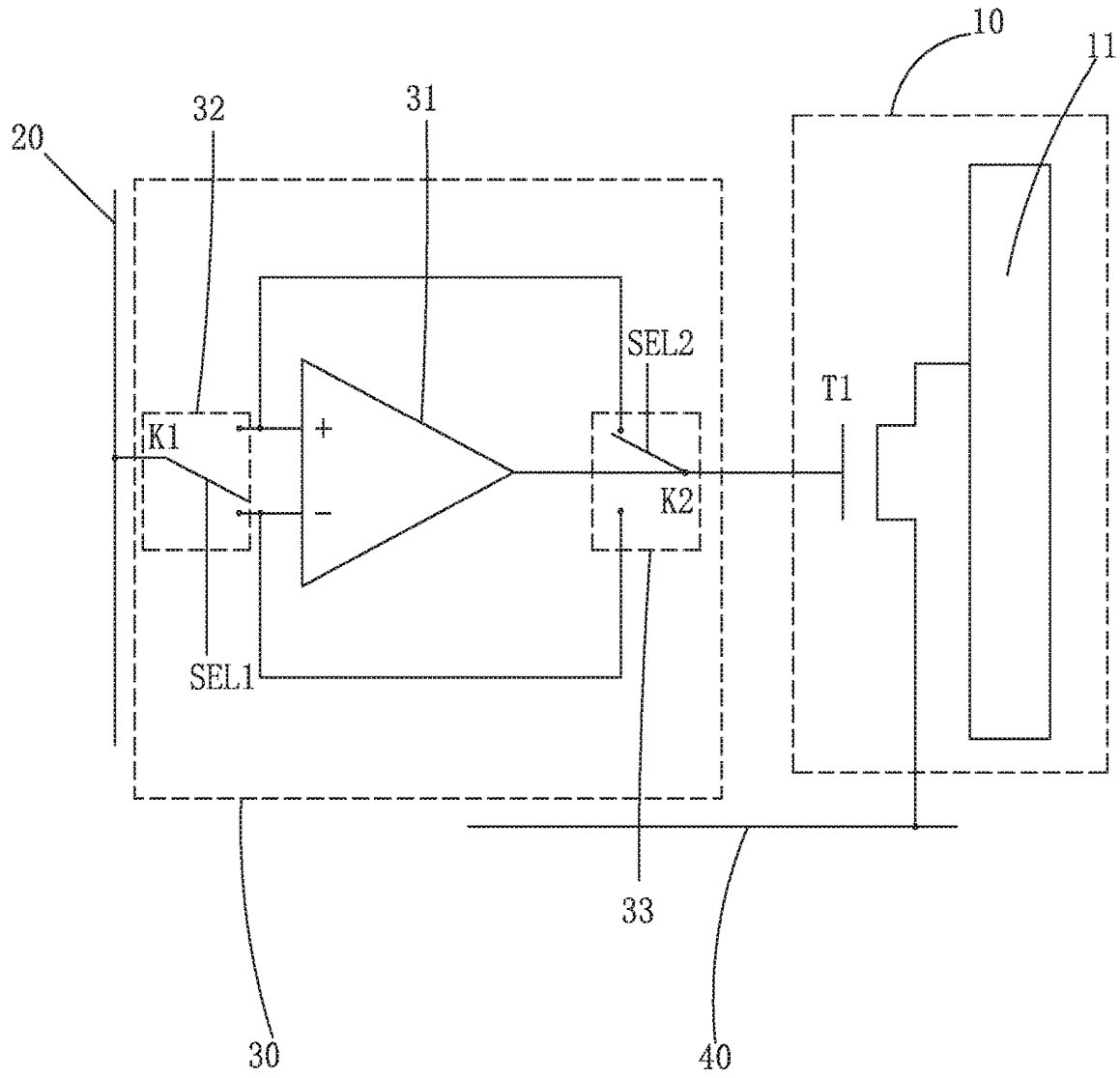


FIG. 4

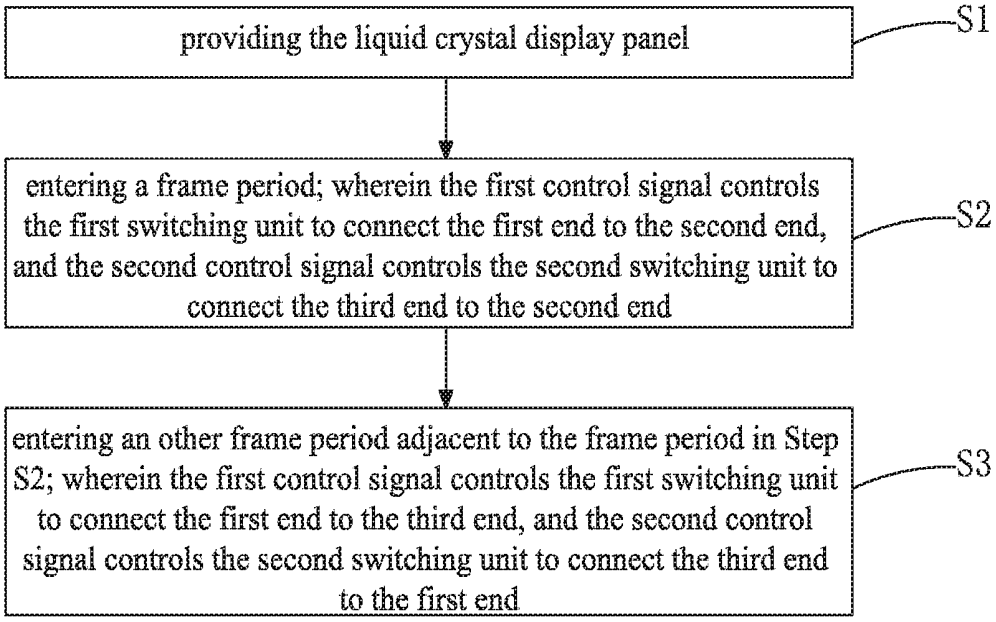

providing the liquid crystal display panel
S1
entering a frame period; wherein the first control signal controls the first switching unit to connect the first end to the second end, and the second control signal controls the second switching unit to connect the third end to the second end
S2
entering an other frame period adjacent to the frame period in Step S2; wherein the first control signal controls the first switching unit to connect the first end to the third end, and the second control signal controls the second switching unit to connect the third end to the first end
S3

FIG. 5

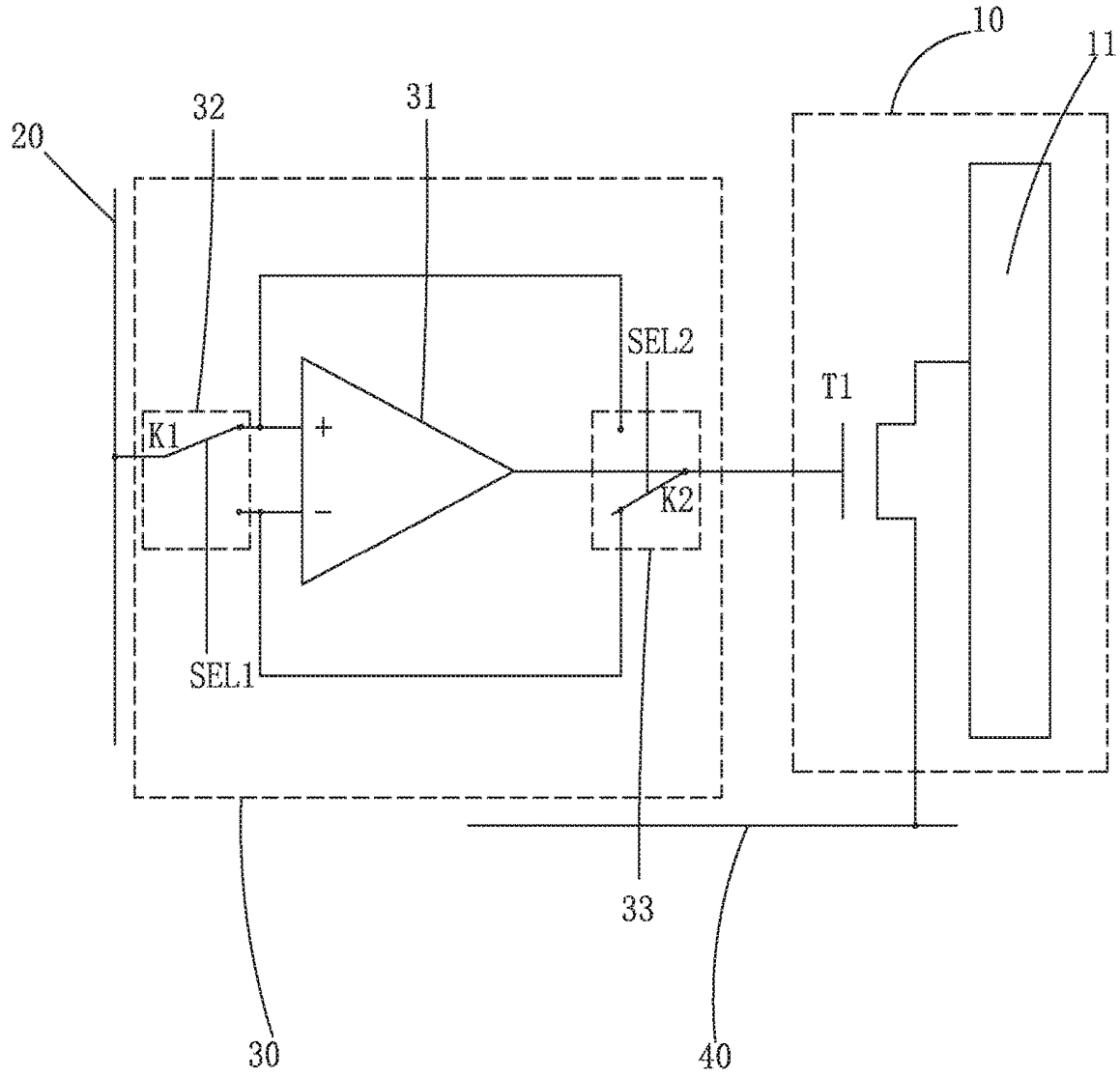


FIG. 6

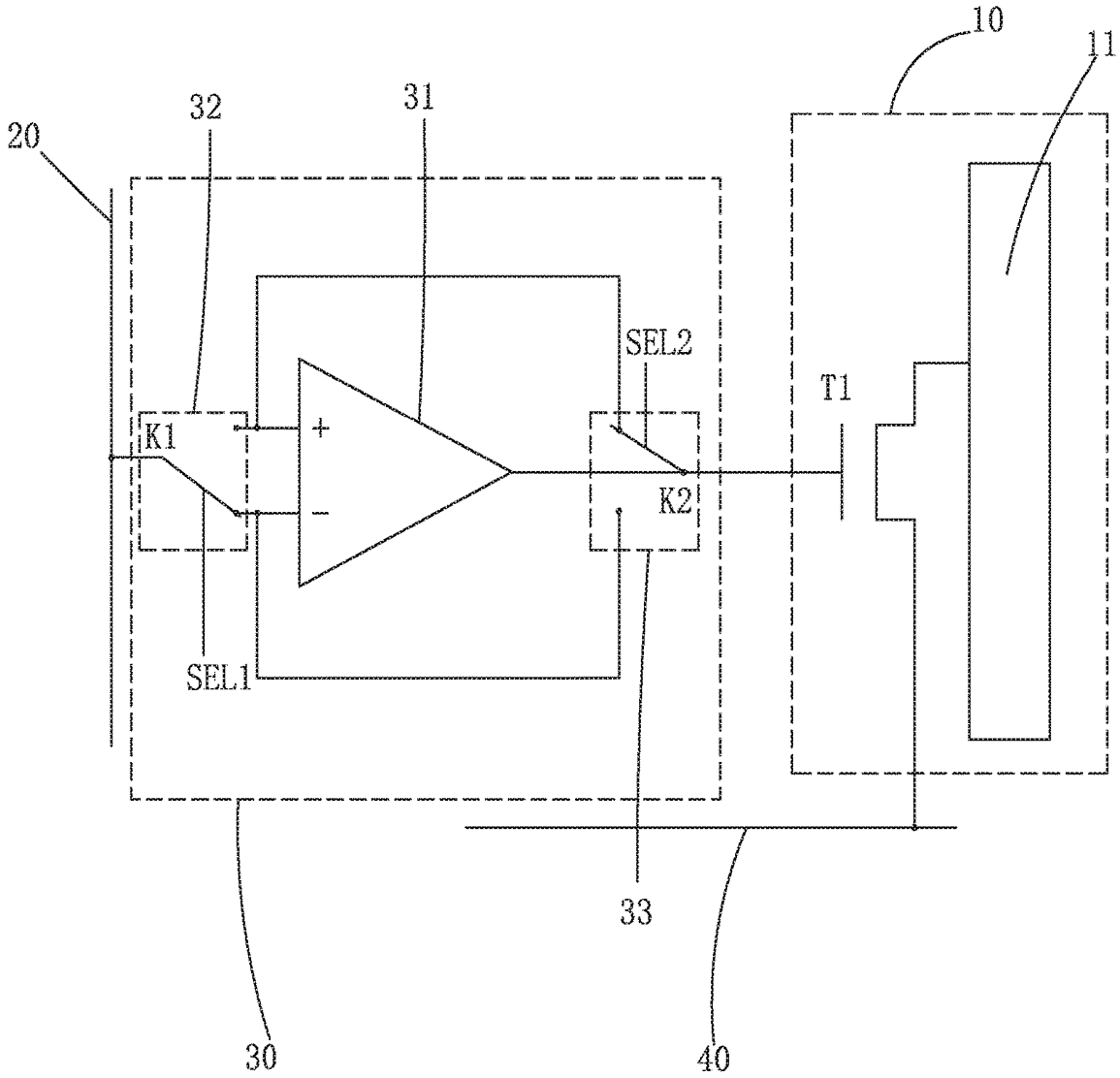


FIG. 7

LIQUID CRYSTAL DISPLAY PANEL AND DRIVING METHOD THEREOF

FIELD OF THE INVENTION

[0001] The present invention relates to a display technology field, and more particularly to a liquid crystal display panel and a driving method thereof.

BACKGROUND OF THE INVENTION

[0002] In the display skill field, the Liquid Crystal Display (LCD) and other panel displays have been gradually replaced the Cathode Ray Tube (CRT) displays. A liquid crystal display possesses advantages of being ultra thin, power saved and radiation free and has been widely utilized.

[0003] Most of the liquid crystal displays on the present market are back light type liquid crystal display devices, which comprise a liquid crystal display panel and a back light module. Generally, the liquid crystal display panel comprises a Color Filter (CF) substrate, a Thin Film Transistor (TFT) substrate, Liquid Crystal (LC) sandwiched between the CF substrate and the TFT substrate and sealant. The working principle of the liquid crystal display panel is to locate liquid crystal molecules between two parallel glass substrates, and a plurality of vertical and horizontal tiny electrical wires are between the two glass substrates. The light of back light module is reflected to generate images by applying driving voltages to control whether the liquid crystal molecules to be changed directions.

[0004] In the prior art, each pixel of the liquid crystal display device has a thin film transistor of which a gate is coupled to a horizontal scanning line and a drain is coupled to a vertical data line. If a positive voltage is applied to a certain scanning line, the thin film transistor coupled to the scanning line is activated, so that the data voltage on the data line can be inputted into the pixel activated by the thin film transistor to control various liquid crystal transmittances and display effect.

[0005] Please refer to FIG. **1**. The liquid crystal display panel of the prior art includes a plurality of pixels **100**, a plurality of scanning lines **200**, a plurality of input modules **300**, the plurality of data lines **400** and a substrate **500**. The plurality of pixels **100**, the plurality of scanning lines **200**, the plurality of input modules **300** and the plurality of data lines **400** are all disposed on the substrate **500**. Each of the pixels **100** is correspondingly coupled to one of the input modules **300**. The input module **300** corresponding to each row of pixels **100** is correspondingly coupled to one of the scanning lines **200**. Each column of the pixels **100** is correspondingly coupled to one of the data lines **400**. Each of the pixels **100** includes a thin film transistor T**10** and a pixel electrode **110**. A source of the thin film transistor T**10** is electrically coupled to the data line **400** corresponding to the pixel **100** where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode **110**. The input module **300** includes an operational amplifier **310**. The non-inverting input end of the operational amplifier **310** is electrically coupled to the corresponding scanning line **200**, and the output end is electrically coupled to the gate of the thin film transistor T**10** of the corresponding pixel **100**, and the inverting input end is electrically coupled to the output end. Each operational amplifier **310** has an offset voltage. After the output end is shorted to the inverting input end, the difference between the voltage inputted to the non-inverting input end and the voltage outputted from the output end is the offset voltage. The offset voltages of the operational amplifiers **310** in the different input modules **300** may be different, which may cause that after the scanning signals transmitted by the scanning lines **200** are outputted to different pixels **100** through different operational amplifiers **310**, the voltages actually received by the gates of the thin film transistors T**10** in the different pixels **100** are different, resulting in inconsistent activated degrees of the thin film transistors T**10** in the different pixels **100**, so that the chargings of the respective pixels **100** are inconsistent, thereby affecting the display effect of the liquid crystal display panel.

SUMMARY OF THE INVENTION

[0006] An objective of the present invention is to provide a liquid crystal display panel, which can compensate for display unevenness caused by different activated degrees of thin film transistors in different pixels to improve display effect.

[0007] Another objective of the present invention is to provide a driving method of a liquid crystal display panel, which can compensate for display unevenness caused by different activated degrees of thin film transistors in different pixels to improve display effect.

[0008] For realizing the aforesaid objectives, the present invention first provides a liquid crystal display panel, including a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules;

[0009] wherein each of the pixels is correspondingly coupled to one of the input modules; the input module corresponding to each row of pixels is electrically coupled to one of the scanning lines; each of the pixels includes a thin film transistor; each of the input modules includes an operational amplifier, a first switching unit and a second switching unit; a control end of the first switching unit is coupled to a first control signal, and a first end of the first switching unit is electrically coupled to the scanning line corresponding to the input module where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier; a control end of the second switching unit is coupled to a second control signal, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier; the output end of the operational amplifier is electrically coupled to a gate of the thin film transistor of the pixel corresponding to the input module where the operational amplifier is located;

[0010] wherein in one of any two adjacent frame periods, the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit, and in an other of any two adjacent frame periods, the first control signal controls the first switching unit to connect the first end of the first switching unit to the

third end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the first end of the second switching unit.

[0011] The liquid crystal display panel further includes a plurality of data lines; wherein each column of the pixels is correspondingly coupled to one of the data lines.

[0012] Each of the pixels further includes a pixel electrode; a source of the thin film transistor is electrically coupled to the data line corresponding to the pixel where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode.

[0013] The first switching unit is a first single-pole double-throw switch, and the control end, the first end, the second end and the third end of the first switching unit are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch;

[0014] the second switching unit is a second single-pole double-throw switch, and the control end, the first end, the second end and the third end of the second switching unit are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch.

[0015] In an odd frame period, the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit, and in an even frame period, the first control signal controls the first switching unit to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the first end of the second switching unit.

[0016] The present invention further provides a driving method of a liquid crystal display panel, comprising steps of:

[0017] Step S**1**, providing the liquid crystal display panel;

[0018] wherein the liquid crystal display panel includes a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules;

[0019] wherein each of the pixels is correspondingly coupled to one of the input modules; the input module corresponding to each row of pixels is correspondingly coupled to one of the scanning lines; each of the pixels includes a thin film transistor; each of the input modules includes an operational amplifier, a first switching unit and a second switching unit; a control end of the first switching unit is coupled to a first control signal, and a first end of the first switching unit is electrically coupled to the scanning line corresponding to the input module where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier; a control end of the second switching unit is coupled to a second control signal, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier; the output end of the operational amplifier is electrically coupled to a gate of the thin film transistor of the pixel corresponding to the input module where the operational amplifier is located;

[0020] Step S**2**, entering a frame period;

[0021] wherein the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit; and

[0022] Step S**3**, entering an other frame period adjacent to the frame period in Step S**2**;

[0023] wherein the first control signal controls the first switching unit to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the first end of the second switching unit.

[0024] The liquid crystal display panel further includes a plurality of data lines; wherein each column of the pixels is correspondingly coupled to one of the data lines.

[0025] Each of the pixels further includes a pixel electrode; a source of the thin film transistor is electrically coupled to the data line corresponding to the pixel where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode.

[0026] The first switching unit is a first single-pole double-throw switch, and the control end, the first end, the second end and the third end of the first switching unit are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch;

[0027] the second switching unit is a second single-pole double-throw switch, and the control end, the first end, the second end and the third end of the second switching unit are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch.

[0028] The one frame period in Step S**2** is an odd frame period, and the other frame period in Step S**3** is an even frame period adjacent to the odd frame period in Step S**2**.

[0029] The benefits of the present invention are: The liquid crystal display panel includes a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules. In one of any two adjacent frame periods, the first switching unit of the input module connects the first end thereof to the second end thereof to connect the non-inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the second end thereof to connect the inverting end of the operational amplifier to the output end. In the other of any two adjacent frame periods, the first switching unit of the input module connects the first end thereof to the third end thereof to connect the inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the first end thereof to connect the non-inverting end of the operational amplifier to the output end. Thus, it can compensate for display unevenness caused by different activated degrees of thin film transistors in different pixels to improve display effect. The driving method of the liquid crystal display panel according to the present invention can compensate for display unevenness caused by

different activated degrees of thin film transistors in different pixels to improve display effect.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] In order to better understand the characteristics and technical aspect of the invention, please refer to the following detailed description and accompanying drawings of the present invention. However, the drawings are provided for reference only and are not intended to be limiting of the invention.

[0031] In drawings,

[0032] FIG. **1** is a structural diagram of a liquid crystal display panel according to the prior art;

[0033] FIG. **2** is a connection diagram of an input module, a scanning line and a pixel of a liquid crystal display panel according to the prior art;

[0034] FIG. **3** is a structure diagram of a liquid crystal display panel of the present invention;

[0035] FIG. **4** is a connection diagram of an input module, a scanning line and a pixel of a liquid crystal display panel according to the present invention;

[0036] FIG. **5** is a flow chart of a driving method of a liquid crystal display panel of the present invention;

[0037] FIG. **6** is a diagram of Step S**2** of a driving method of a liquid crystal display panel of the present invention;

[0038] FIG. **7** is a diagram of Step S**3** of a driving method of a liquid crystal display panel of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0039] For better explaining the technical solution and the effect of the present invention, the present invention will be further described in detail with the accompanying drawings and the specific embodiments.

[0040] Please refer to FIG. **3** and FIG. **4**. The present invention provides a liquid crystal display panel, including a plurality of pixels **10** arranged in an array, a plurality of scanning lines **20**, a plurality of input modules **30**, a plurality of data lines **40** and a substrate **50**. The plurality of pixels **10**, the plurality of scanning lines **20**, the plurality of input modules **30** and the plurality of data lines **40** are all disposed on the substrate **50**.

[0041] wherein each of the pixels is correspondingly coupled to one of the input modules; The input module **30** corresponding to each row of pixels **10** is correspondingly coupled to one of the scanning lines **20**. Each column of the pixels **10** is correspondingly coupled to one of the data lines **40**. Each of the pixels **10** includes a thin film transistor T**1** and a pixel electrode **11**. Each of the input modules **30** includes an operational amplifier **31**, a first switching unit **32** and a second switching unit **33**. A control end of the first switching unit **32** is coupled to a first control signal SEL**1**, and a first end of the first switching unit is electrically coupled to the scanning line **20** corresponding to the input module **30** where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier **31**, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier **31**. A control end of the second switching unit **33** is coupled to a second control signal SEL**2**, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier **31**, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier **31**, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier **31**. The output end of the operational amplifier **31** is electrically coupled to a gate of the thin film transistor T**1** of the pixel **10** corresponding to the input module **30** where the operational amplifier is located. A source of the thin film transistor T**1** is electrically coupled to the data line **40** corresponding to the pixel **10** where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode **11**.

[0042] Specifically, in one of any two adjacent frame periods, please refer to FIG. **6**, the first control signal SEL**1** controls the first switching unit **32** to connect the first end thereof to the second end thereof to connect the non-inverting end of the operational amplifier **31** to the corresponding scanning line **20**, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end thereof to the first end thereof to connect the inverting end of the operational amplifier **31** to the output end. Then, since the operational amplifier **31** has an offset voltage, as the scanning line **20** transmits the scanning signal to the non-inverting input end of the operational amplifier **31** and is outputted to the gate of the thin film transistor T**1** of the corresponding pixel **10** via the output end of the operational amplifier **31**, the voltage value outputted by the scanning line **20** is greater than the voltage value received by the thin film transistor T**1** of the corresponding pixel **10** and the difference is the offset voltage of the operational amplifier **31**. In the other of any two adjacent frame periods. the first control signal SEL**1** controls the first switching unit **32** to connect the first end thereof to the third end thereof to connect the inverting end of the operational amplifier **31** to the corresponding scanning line **20**, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end thereof to the first end thereof to connect the non-inverting end of the operational amplifier **31** to the output end. Then, since the operational amplifier **31** has an offset voltage, as the scanning line **20** transmits the scanning signal to the non-inverting input end of the operational amplifier **31** and is outputted to the gate of the thin film transistor T**1** of the corresponding pixel **10** via the output end of the operational amplifier **31**, the voltage value outputted by the scanning line **20** is less than the voltage value received by the thin film transistor T**1** of the corresponding pixel **10** and the difference is the offset voltage of the operational amplifier **31**. Thus, the voltage value received by the gate of the thin film transistor T**1** of the same pixel **10** in the adjacent two frame periods respectively correspond to the offset voltage of the operational amplifier **31** with the high voltage value outputted by corresponding scanning line **20** and the offset voltage of the operational amplifier **31** with the low voltage value. The voltage values received by the gate of the thin film transistor T**1** of the same pixel **10** in the adjacent two frame periods are mutually compensated. Even if the offset voltages of the operational amplifiers **31** corresponding to the different pixels **10** are different, the compensation of the adjacent two frames can compensate for the display unevenness caused by the inconsistency in the activated degrees of the thin film transistors T**1** of the respective pixels **10** with utilization of the visual delay effect of the human eye.

[0043] Preferably, the first switching unit **32** is a first single-pole double-throw switch K**1**, and the control end, the first end, the second end and the third end of the first switching unit **32** are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch K**1**. The second switching unit **33** is a second single-pole double-throw switch K**2**, and the control end, the first end, the second end and the third end of the second switching unit **33** are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch K**2**.

[0044] Preferably, in an odd frame period, the first control signal SEL**1** controls the first switching unit **32** to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end of the second switching unit to the second end of the second switching unit, and in an even frame period, the first control signal SEL**1** controls the first switching unit **32** to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end of the second switching unit to the first end of the second switching unit.

[0045] On the basis of the same inventive idea, referring to FIG. **5**, the present invention further provides a driving method of a liquid crystal display panel, including:

[0046] Step S**1**, providing the liquid crystal display panel.

[0047] The liquid crystal display panel includes a plurality of pixels **10** arranged in an array, a plurality of scanning lines **20**, a plurality of input modules **30**, a plurality of data lines **40** and a substrate **50**. The plurality of pixels **10**, the plurality of scanning lines **20**, the plurality of input modules **30** and the plurality of data lines **40** are all disposed on the substrate **50**.

[0048] Each of the pixels **10** is correspondingly coupled to one of the input modules **30**. The input module **30** corresponding to each row of pixels **10** is correspondingly coupled to one of the scanning lines **20**. Each column of the pixels **10** is correspondingly coupled to one of the data lines **40**. Each of the pixels **10** includes a thin film transistor T**1** and a pixel electrode **11**. Each of the input modules **30** includes an operational amplifier **31**, a first switching unit **32** and a second switching unit **33**. A control end of the first switching unit **32** is coupled to a first control signal SEL**1**, and a first end of the first switching unit is electrically coupled to the scanning line **20** corresponding to the input module **30** where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier **31**, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier **31**. A control end of the second switching unit **33** is coupled to a second control signal SEL**2**, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier **31**, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier **31**, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier **31**. The output end of the operational amplifier **31** is electrically coupled to a gate of the thin film transistor T**1** of the pixel **10** corresponding to the input module **30** where the operational amplifier is located. A source of the thin film transistor T**1** is electrically coupled to the data line **40** corresponding to the pixel **10** where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode **11**.

[0049] Preferably, the first switching unit **32** is a first single-pole double-throw switch K**1**, and the control end, the first end, the second end and the third end of the first switching unit **32** are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch K**1**.

[0050] The second switching unit **33** is a second single-pole double-throw switch K**2**, and the control end, the first end, the second end and the third end of the second switching unit **33** are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch K**2**.

[0051] Step S**2**, entering one frame period, wherein the plurality of scanning lines **20** sequentially transmit scanning signals to the input modules **30** corresponding to the plurality of rows of pixels **10**.

[0052] Please refer to FIG. **6**, the first control signal SEL**1** controls the first switching unit **32** to connect the first end thereof to the second end thereof to connect the non-inverting end of the operational amplifier **31** to the corresponding scanning line **20**, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end thereof to the first end thereof to connect the inverting end of the operational amplifier **31** to the output end. Then, since the operational amplifier **31** has an offset voltage, as the scanning line **20** transmits the scanning signal to the non-inverting input end of the operational amplifier **31** and is outputted to the gate of the thin film transistor T**1** of the corresponding pixel **10** via the output end of the operational amplifier **31**, the voltage value outputted by the scanning line **20** is greater than the voltage value received by the thin film transistor T**1** of the corresponding pixel **10** and the difference is the offset voltage of the operational amplifier **31**.

[0053] The one frame period in Step S**2** is an odd frame period.

[0054] Step S**3**, entering an other frame period adjacent to the frame period in Step S**2**, wherein the plurality of scanning lines **20** sequentially transmit scanning signals to the input modules **30** corresponding to the plurality of rows of pixels **10**.

[0055] Please refer to FIG. **7**, the first control signal SEL**1** controls the first switching unit **32** to connect the first end thereof to the third end thereof to connect the inverting end of the operational amplifier **31** to the corresponding scanning line **20**, and the second control signal SEL**2** controls the second switching unit **33** to connect the third end thereof to the first end thereof to connect the non-inverting end of the operational amplifier **31** to the output end. Then, since the operational amplifier **31** has an offset voltage, as the scanning line **20** transmits the scanning signal to the non-inverting input end of the operational amplifier **31** and is outputted to the gate of the thin film transistor T**1** of the corresponding pixel **10** via the output end of the operational amplifier **31**, the voltage value outputted by the scanning line **20** is less than the voltage value received by the thin film transistor T**1** of the corresponding pixel **10** and the difference is the offset voltage of the operational amplifier **31**. Thus, the voltage value received by the gate of the thin film

transistor T1 of the same pixel **10** in the adjacent two frame periods respectively correspond to the offset voltage of the operational amplifier **31** with the high voltage value outputted by corresponding scanning line **20** and the offset voltage of the operational amplifier **31** with the low voltage value. The voltage values received by the gate of the thin film transistor T1 of the same pixel **10** in the adjacent two frame periods are mutually compensated. Even if the offset voltages of the operational amplifiers **31** corresponding to the different pixels **10** are different, the compensation of the adjacent two frames can compensate for the display unevenness caused by the inconsistency in the activated degrees of the thin film transistors T1 of the respective pixels **10** with utilization of the visual delay effect of the human eye.

[0056] Preferably, the other frame period in Step S3 is an even frame period adjacent to the odd frame period in Step S2.

[0057] In conclusion, the liquid crystal display panel of the present invention includes a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules. In one of any two adjacent frame periods, the first switching unit of the input module connects the first end thereof to the second end thereof to connect the non-inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the second end thereof to connect the inverting end of the operational amplifier to the output end. In the other of any two adjacent frame periods, the first switching unit of the input module connects the first end thereof to the third end thereof to connect the inverting end of the operational amplifier to the corresponding scanning line, and the second switching unit connects the third end thereof to the first end thereof to connect the non-inverting end of the operational amplifier to the output end. Thus, it can compensate for display unevenness caused by different activated degrees of thin film transistors in different pixels to improve display effect. The driving method of the liquid crystal display panel according to the present invention can compensate for display unevenness caused by different activated degrees of thin film transistors in different pixels to improve display effect.

[0058] Above are only specific embodiments of the present invention, the scope of the present invention is not limited to this, and to any persons who are skilled in the art, change or replacement which is easily derived should be covered by the protected scope of the invention. Thus, the protected scope of the invention should go by the subject claims.

What is claimed is:

1. A liquid crystal display panel, including a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules;

wherein each of the pixels is correspondingly coupled to one of the input modules; the input module corresponding to each row of pixels is electrically coupled to one of the scanning lines; each of the pixels includes a thin film transistor; each of the input modules includes an operational amplifier, a first switching unit and a second switching unit; a control end of the first switching unit is coupled to a first control signal, and a first end of the first switching unit is electrically coupled to the scanning line corresponding to the input module where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier; a control end of the second switching unit is coupled to a second control signal, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier; the output end of the operational amplifier is electrically coupled to a gate of the thin film transistor of the pixel corresponding to the input module where the operational amplifier is located;

wherein in one of any two adjacent frame periods, the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit, and in an other of any two adjacent frame periods, the first control signal controls the first switching unit to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the first end of the second switching unit.

2. The liquid crystal display panel according to claim **1**, further including a plurality of data lines; wherein each column of the pixels is correspondingly coupled to one of the data lines.

3. The liquid crystal display panel according to claim **2**, wherein each of the pixels further includes a pixel electrode; a source of the thin film transistor is electrically coupled to the data line corresponding to the pixel where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode.

4. The liquid crystal display panel according to claim **1**, wherein the first switching unit is a first single-pole double-throw switch, and the control end, the first end, the second end and the third end of the first switching unit are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch;

the second switching unit is a second single-pole double-throw switch, and the control end, the first end, the second end and the third end of the second switching unit are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch.

5. The liquid crystal display panel according to claim **1**, wherein in an odd frame period, the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit, and in an even frame period, the first control signal controls the first switching unit to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal controls the second switching

unit to connect the third end of the second switching unit to the first end of the second switching unit.

6. A driving method of a liquid crystal display panel, including:

Step S**1**, providing the liquid crystal display panel;

wherein the liquid crystal display panel includes a plurality of pixels arranged in an array, a plurality of scanning lines and a plurality of input modules;

wherein each of the pixels is correspondingly coupled to one of the input modules; the input module corresponding to each row of pixels is correspondingly coupled to one of the scanning lines; each of the pixels includes a thin film transistor; each of the input modules includes an operational amplifier, a first switching unit and a second switching unit; a control end of the first switching unit is coupled to a first control signal, and a first end of the first switching unit is electrically coupled to the scanning line corresponding to the input module where the first switching unit is located, and a second end of the first switching unit is electrically coupled to a non-inverting input end of the operational amplifier, and a third end of the first switching unit is electrically coupled to an inverting input end of the operational amplifier; a control end of the second switching unit is coupled to a second control signal, and a first end of the second switching unit is electrically coupled to the non-inverting input end of the operational amplifier, and a second end of the second switching unit is electrically coupled to the inverting input end of the operational amplifier, and a third end of the second switching unit is electrically coupled to an output of the operational amplifier; the output end of the operational amplifier is electrically coupled to a gate of the thin film transistor of the pixel corresponding to the input module where the operational amplifier is located;

Step S**2**, entering a frame period;

wherein the first control signal controls the first switching unit to connect the first end of the first switching unit to the second end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the second end of the second switching unit; and

Step S**3**, entering an other frame period adjacent to the frame period in Step S**2**;

wherein the first control signal controls the first switching unit to connect the first end of the first switching unit to the third end of the first switching unit, and the second control signal controls the second switching unit to connect the third end of the second switching unit to the first end of the second switching unit.

7. The driving method of the liquid crystal display panel according to claim **6**, wherein the liquid crystal display panel further includes a plurality of data lines; wherein each column of the pixels is correspondingly coupled to one of the data lines.

8. The driving method of the liquid crystal display panel according to claim **7**, wherein each of the pixels further includes a pixel electrode; a source of the thin film transistor is electrically coupled to the data line corresponding to the pixel where the thin film transistor is located, and a drain of the thin film transistor is electrically coupled to the pixel electrode.

9. The driving method of the liquid crystal display panel according to claim **6**, wherein the first switching unit is a first single-pole double-throw switch, and the control end, the first end, the second end and the third end of the first switching unit are respectively a control end, a static contact, a first moving contact and a second moving contact of the first single-pole double-throw switch;

the second switching unit is a second single-pole double-throw switch, and the control end, the first end, the second end and the third end of the second switching unit are respectively a control end, a first moving contact, a second moving contact and a static contact of the second single-pole double-throw switch.

10. The driving method of the liquid crystal display panel according to claim **6**. wherein the one frame period in Step S**2** is an odd frame period, and the other frame period in Step S**3** is an even frame period adjacent to the odd frame period in Step S**2**.

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专利名称(译)	液晶显示面板及其驱动方法		
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摘要(译)

提供了一种LCD面板及其驱动方法。 LCD面板包括像素，扫描线和输入模块。 在任何两个相邻帧周期中的一个中，第一开关单元将其第一端连接到第二端，以将运算放大器的非反相端连接到相应的扫描线，第二开关单元将其第三端连接到 其第二端连接到运算放大器的反相端到输出端。 在任意两个相邻帧周期中的另一个周期中，第一开关单元将其第一端连接到第三端，以将运算放大器的反相端连接到相应的扫描线，第二开关单元将其第三端连接到 其第一端将运算放大器的非反相端连接到输出端。