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(54) **Organic light emitting display integrated with touch screen panel**

Organische lichtemittierende Anzeige, die in einer Berührungsbildschirmtafel integriert ist

Affichage électroluminescent organique intégré avec panneau d'écran tactile

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Description

[0001] The present invention relates to an organic light emitting display, and more particularly, to an organic light emitting display integrated with a touch screen panel.

[0002] A touch screen panel is an input device that provides a capability to select the content displayed on the screen of an image display device by a human hand or an object (e.g., a stylus) to input the command of a user.

[0003] Therefore, the touch screen panel may be provided on the entire surface of the image display device to convert a contact position of the human hand or the object into an electrical signal. The instruction selected in the contact position is received as an input signal.

[0004] Since the touch screen panel may replace an additional input device coupled to the image display device, such as a keyboard or a mouse, the use range is increasing.

[0005] Examples of a touch screen panel type include a resistance layer type, a photo-sensing type, and an electro-capacitive type. Among the above types, the electro-capacitive type touch screen panel detects a change in capacitance formed by conductive sensing patterns together with other peripheral sensing patterns or a ground electrode when the human hand or another object contacts the touch screen panel to convert the contact position into the electrical signal.

[0006] US2011/175846 discloses an electro-capacitive touch screen panel which includes a cover plate, touch sensing electrodes and a display panel.

[0007] US2012/105381 discloses a liquid crystal display with an integrated touch screen panel.

[0008] US2011/316802 discloses an OLED display device with a built-in touch panel.

[0009] EP1496495 discloses a pixel circuit for driving OLED pixels.

[0010] The electro-capacitive touch screen panel may be attached to the external surface of a flat panel display (FPD) such as a liquid crystal display (LCD) and an organic light emitting display (OLED).

[0011] However, when the touch screen panel is attached to the external surface of the FPD, an adhesive layer between the touch screen panel and the FPD may be used and processes of manufacturing the touch screen panel are required in addition to the FPD, thereby increasing process time and process cost.

[0012] In addition, the touch screen panel may be attached to the external surface of the FPD so that the entire thickness of the FPD increases.

[0013] Accordingly, embodiments of the present invention provide an organic light emitting display with an integrated touch screen panel, in which control lines arranged in a panel of an organic light emitting display are used as driving electrodes of an electro-capacitive touch screen panel, and in which a signal applied to the control lines during a touch recognition operation is input in synchronization with a signal applied to the display panel so as not to affect display.

[0014] In order to achieve the foregoing and/or other aspects of the present invention, an embodiment of the present invention provides an organic light emitting display with a touch screen panel according to claim 1.

[0015] In an embodiment, each of the second electrodes of the touch screen panel comprises a group of adjacent control lines.

[0016] The first electrodes may be sensing electrodes of the touch screen panel and the second electrodes may be driving electrodes of the touch screen panel.

[0017] The first electrodes may be in a display region of the second substrate corresponding to a region of the first substrate in which the pixels are located.

[0018] Sensing lines for coupling the first electrodes to a touch driving circuit through a first touch pad may be in a non-display region outside the display region.

[0019] In an embodiment, the control lines may be coupled to the touch driving circuit through a second touch pad, which is in a non-display region of the first substrate. The first touch pad on the second substrate may be coupled to the same touch driving circuit as the second touch pad unit on the first substrate.

[0020] In an embodiment, the control lines may be initialization driving control lines for providing an initialization voltage to the pixels.

[0021] Each of the pixels may include an organic light emitting diode (OLED), and a pixel circuit including: a first transistor configured to control an amount of current supplied to the OLED and having a gate electrode that is configured to be initialized by an initialization voltage; and a second transistor coupled between the gate electrode of the first transistor and a control line of the control lines to provide the initialization voltage to the gate electrode of the first transistor.

[0022] In an embodiment, the second transistor may be configured to provide an initialization voltage from the control line at a low level voltage that is lower than a voltage of data signals applied to the pixels. The control lines may be arranged in groups, each of the second electrodes of the touch screen panel may correspond to one of the groups of the control lines, pixel circuits (including the pixel circuit of each of the pixels) together may be configured to sequentially apply the initialization voltage to the groups of the control lines.

[0023] The pixel circuits together may be configured to apply a high level voltage to the groups of the control lines excluding a group of the control lines to which the low level voltage is applied.

[0024] As described above, according to embodiments of the present invention, the control lines arranged in the panel of the organic light emitting display may be used as the driving electrodes of the electro-capacitive touch screen panel so that it is possible to realize the organic light emitting display in which the thin touch screen panel is mounted without additional processes.

[0025] In addition, the signal applied to the control lines during the touch recognition operation is input in synchro-

nization with the signal input to the display panel so as not to affect display so that display and touch recognition operations may be concurrently (or simultaneously) performed.

[0026] The accompanying drawings, together with the specification, illustrate exemplary embodiments of the present invention, and, together with the description, serve to explain the principles of the present invention.

FIG. 1 is an exploded plan view of an organic light emitting display integrated with a touch screen panel according to an embodiment of the present invention;

FIG. 2 is a circuit diagram of an embodiment of the pixel illustrated in FIG. 1;

FIG. 3 is a waveform chart of a driving signal supplied to the pixel illustrated in FIG. 2; and

FIG. 4 is a perspective view schematically illustrating structures of driving electrodes and sensing electrodes of the touch screen panel according to an embodiment of the present invention.

[0027] When an element is described as being coupled (e.g., electrically coupled or connected) to another element, that element may be directly coupled to the other element or may be indirectly coupled to the other element with one or more intervening elements interposed therebetween. FIG. 1 is an exploded plan view of an organic light emitting display integrated with a touch screen panel according to an embodiment of the present invention.

[0028] Referring to Figure 1, in the organic light emitting display integrated with the touch screen panel according to an embodiment of the present invention, first electrodes (sensing electrodes) 212 of the touch screen panel are on (e.g., directly formed, located, placed, or arranged on) one surface of a top substrate 200 of the touch screen panel and second electrodes (driving electrodes) of the touch screen panel are realized by initialization control lines 112 arranged on a bottom substrate 100 of the organic light emitting display.

[0029] Here, the top substrate 200, which may function as an encapsulating substrate of the organic light emitting display, may be formed of, for example, a glass material or a flexible thin film.

[0030] In addition, one surface of the top substrate 200 may be the external surface of the top substrate. For example, in FIG. 1, one surface of the top substrate 200 corresponds to the external surface of the top substrate 200.

[0031] While the above is one embodiment of the present invention, other embodiments of the present invention are not limited to the above. For example, the first electrodes 212 of the touch screen panel may be formed on an internal surface of the top substrate 200 (e.g., a surface facing toward the interior of the organic light emitting display).

[0032] Referring back to FIG. 1, the structure of the organic light emitting display integrated with the touch screen panel according to an embodiment of the present invention will now be described in more detail.

[0033] In the organic light emitting display integrated with the touch screen panel according to an embodiment of the present invention, the first electrodes 212 of the touch screen panel and sensing lines 214 for coupling the first electrodes 212 to an external touch driving circuit (not shown) through a first touch pad unit 119a are formed on one surface of the top substrate 200 that covers (e.g., seals up) the bottom substrate 100 with respect to a plurality of pixels 120 formed in a display region 300 of the top substrate 100.

[0034] Here, the first electrodes 212 may be formed at the display region 300 of the top substrate 200 and the sensing lines 214 may be formed at a non-display region positioned outside the display region 300 of the top substrate 200.

In addition, a plurality of signal lines and control lines may be coupled to the pixels 120 formed at the display region 300 of the bottom substrate 100. For example, FIG. 1 illustrates scan lines 114 and data lines 116 arranged as signal lines, and illustrates initialization driving control lines 112 arranged as control lines. Other lines, for example, emission control lines, may be additionally coupled to the pixels 120, however, for convenience, these other lines are not shown.

[0035] In addition, at least a portion of the initialization driving control lines 112 may be arranged in a first direction (the X axis direction) to run parallel (or substantially parallel) with at least a portion of the scan lines 114 (e.g., the portions within the display region 300). The plurality of pixels 120 formed in a row (like the scan lines 114) may be respectively coupled to the initialization driving control lines 112 (e.g., each of the pixels in a same row may be coupled to one of the initialization driving control lines arranged in the same row).

[0036] In addition, the signal lines (e.g., the scan lines 114 and the data lines 116) and the control lines (e.g., the initialization driving control lines 112) may be coupled to a driving pad unit 118 and a second touch pad unit 119b, respectively, to receive signals from a scan driving circuit, a data driving circuit, or a touch driving circuit, which are external driving circuits.

[0037] The first touch pad unit 119a formed on the top substrate 200 may be coupled to the same touch driving circuit (not shown) as the second touch pad unit 119b formed on the bottom substrate 100.

[0038] For example, when the touch driving circuit is electrically coupled to the second touch pad unit 119b formed on the bottom substrate 100 by a flexible printed circuit board (FPCB), the first touch pad unit 119a formed on the top substrate 200 may be coupled to the second touch pad unit 119b formed on the bottom substrate 100 through a conductive coupler (not shown), for example, a conductive ball, so that the second touch pad unit 119b may be electrically coupled to the touch driving circuit without an additional FPCB contacting the first touch pad unit 119a.

[0039] In the organic light emitting display integrated with the touch screen panel according to an embodiment of the present invention, driving electrodes (second electrodes) of the touch screen panel, which correspond to the first electrodes (sensing electrodes) 212 of the touch screen panel that are formed on one surface of the top substrate 200, are used as the initialization driving control lines 112 arranged on the bottom substrate 100.

[0040] That is, as illustrated in FIG. 1, the first electrodes 212 and the initialization driving control lines 112 (i.e., the second electrodes) are arranged to cross so that a plurality of sensing cells are formed at crossing points.

[0041] For example, when the first electrodes 212 are arranged in a second direction (the Y axis direction), the second electrodes 112 are arranged in the first direction (the X axis direction) to cross the first electrodes 212.

[0042] The first electrodes 212 (i.e., the sensing electrodes) formed on the top substrate 200 may have a larger width (e.g., a significantly larger width) than the initialization driving control lines 112 formed on the bottom substrate 100 as illustrated in FIG. 1. Further, a plurality of adjacent initialization driving control lines 112 may form a group, and the plurality of adjacent initialization driving control lines 112 that form the group may operate as one of the driving electrodes. The other driving electrodes may be realized similarly.

[0043] According to an embodiment of the present invention, in order to realize touch recognition through the sensing cells, during a touch recognition operation, a signal applied to the group of the initialization driving control lines 112, which operate as the driving electrode (the second electrode), is input in synchronization with a signal applied to the pixels associated with the group so as not to affect display.

[0044] A circuit structure of a pixel according to an embodiment of the present invention for realizing the above and the waveform of a driving signal supplied to the pixel will now be described in detail with reference to FIGS. 2 and 3.

[0045] FIG. 2 is a circuit diagram of an embodiment of a pixel illustrated in FIG. 1. FIG. 3 is a waveform chart of a driving signal supplied to the pixel illustrated in FIG. 2.

[0046] Referring to FIG. 2, a pixel 120 according to an embodiment of the present invention includes an organic light emitting diode (OLED), a data line Dm, scan lines Sn-1 and Sn, an emission control line En, and a pixel circuit 122 coupled to an initialization driving control line 112 of the plurality of initialization driving control lines 112 for supplying an initialization voltage Vint to control an amount of current supplied to the OLED.

[0047] An anode electrode of the OLED is coupled to the pixel circuit 122 and a cathode electrode of the OLED is coupled to a second power source ELVSS. Here, the voltage value of the second power source ELVSS is set to be lower than the voltage value of a first power source ELVDD. The OLED generates light with a suitable (e.g., predetermined) brightness to correspond to the amount of current supplied from the pixel circuit 122.

[0048] The pixel circuit 122 controls the amount of current supplied to the OLED to correspond to a data signal supplied to the data line Dm when a scan signal is supplied to the scan line Sn. Accordingly, the pixel circuit 122 may include first to sixth transistors M1 to M6 and a storage capacitor Cst.

[0049] A first electrode of a fourth transistor M4 may be coupled to the data line Dm, and a second electrode of the fourth transistor M4 may be coupled to a first node N1. A gate electrode of the fourth transistor M4 may be coupled to an nth scan line Sn. In an embodiment, the fourth transistor M4 is turned on according to the scan signal supplied to the nth scan line Sn to supply the data signal supplied to the data line Dm to the first node N1.

[0050] A first electrode of the first transistor M1 may be coupled to the first node N1, and a second electrode of the first transistor M1 may be coupled to a first electrode of the sixth transistor M6. A gate electrode of the first transistor M1 may be coupled to a second node N2. Here, the first transistor M1 supplies current corresponding to a voltage charged in the storage capacitor Cst to the OLED.

[0051] A first electrode of a third transistor M3 may be coupled to a second electrode of the first transistor M1, and a second electrode of the third transistor M3 may be coupled to the second node N2. A gate electrode of the third transistor M3 may be coupled to the nth scan line Sn. The third transistor M3 is turned on according to the scan signal supplied to the nth scan line Sn to couple the first transistor M1 in the form of a diode.

[0052] A second transistor M2 may be coupled between the second node N2 and the initialization voltage Vint. A gate electrode of the second transistor M2 may be coupled to an (n-1)th scan line Sn-1. The second transistor M2 is turned on according to an (n-1)th scan signal supplied to the (n-1)th scan line Sn-1 to supply the initialization voltage Vint to the second node N2.

[0053] A first electrode of a fifth transistor M5 may be coupled to the first power source ELVDD and a second electrode of the fifth transistor M5 may be coupled to the first node N1. A gate electrode of the fifth transistor M5 may be coupled to the emission control line En. The fifth transistor M5 is turned on according to an emission control signal supplied from the emission control line En to couple (e.g., electrically couple) the first power source ELVDD to the first node N1.

[0054] The first electrode of the sixth transistor M6 may be coupled to the second electrode of the first transistor M1 and a second electrode of the sixth transistor M6 may be coupled to the anode electrode of the OLED. A gate electrode of the sixth transistor M6 may be coupled to the emission control line En. The sixth transistor M6 is turned on according to an emission control signal to supply current supplied from the first transistor M1 to the OLED.

[0055] As described above, the pixel illustrated in FIG. 2 displays a suitable (e.g., predetermined) image by applying a signal.

[0056] According to an embodiment of the present invention, the initialization voltage Vint initializes the second node N2. Here, the initialization voltage Vint may be set to be a lower voltage than a data signal.

[0057] In an embodiment of the present invention, the initialization driving control lines 112 to which the initialization voltage is applied function as the driving electrodes of the touch screen panel.

[0058] Therefore, the initialization voltage Vint applied to the initialization driving control lines 112 may not always be at a low level voltage that is lower than the data signal, but, instead, the initialization voltage Vint may be a touch driving signal that is sequentially applied to the initialization driving control lines 112 that operate as the driving electrodes by group (e.g., predetermined group).

[0059] In FIG. 3, a subset of the plurality of initialization driving control lines 112 arranged in the first direction (the X axis direction), for example, 40 initialization driving control lines, form a group that operates as a driving electrode (a second electrode) of the plurality of driving electrodes.

[0060] For example, 1^{st} to 40^{th} initialization driving control lines 112 may operate as a first driving electrode, 41^{st} to 80^{th} initialization driving control lines 112 may operate as a second driving electrode, and other groups each formed of the same number of initialization driving control lines 112 may operate as subsequent driving electrodes.

[0061] The initialization driving control lines 112 are arranged in the first direction (the X axis direction) to run parallel with the scan lines Sn and Sn-1 and a plurality of pixels 120 formed in a row (like the scan lines) are coupled to the initialization driving control lines 112.

[0062] The low level initialization voltage Vint may be applied when the scan signal is applied to any one of the (n-1)th scan lines Sn-1 in a group (e.g., a group of 40 row lines) coupled to one of the driving electrodes, and a high level initialization voltage Vint may be applied during the remaining periods.

[0063] Therefore, since the low level initialization voltage Vint applied to the driving electrodes is sequentially applied to the initialization driving control lines 112 by group as illustrated in FIG. 3, the low level initialization voltage Vint may be used as a driving signal of a touch screen panel.

[0064] In addition, since the low level initialization voltage Vint is applied to pixels when the scan signal is applied to the corresponding row lines, the second node N2 of the pixels may be initialized. Since data is not written in pixels when the scan signal is not applied to the corresponding row lines, a high level initialization voltage Vint may be applied instead of a low level initialization voltage Vint without deteriorating the image display.

[0065] As a result, like the signal waveform chart illustrated in FIG. 3, the low level initialization voltage Vint is sequentially applied in synchronization with the scan signal applied to the row lines corresponding to the driving electrode groups so that display and touch recognition operations may be concurrently (or simultaneously) performed.

[0066] FIG. 4 is a perspective view schematically illustrating structures of driving electrodes and sensing electrodes of the touch screen panel according to an embodiment of the present invention.

[0067] Referring to FIG. 4, driving electrodes (second electrodes) 130 are realized by a group of a plurality of the initialization driving control lines 112 arranged on the bottom substrate 100 in the first direction (the X axis direction), and the sensing electrodes 212 corresponding to the driving electrodes 130 are realized by first electrodes 212 formed on one surface of the top substrate 200 in the second direction (the Y direction) that cross the first direction.

[0068] An insulating layer (not shown) provided between the driving electrodes 130 and the sensing electrodes 212 and the top substrate 200 function as dielectric substances.

[0069] In the organic light emitting display according to an embodiment of the present invention, a cathode electrode 400 of an OLED is formed on the initialization driving control lines 112 formed on the bottom substrate 100.

[0070] In this case, since it may be difficult to form an electric field between the driving electrodes 130 (realized by the initialization driving control lines 112) and the sensing electrodes 212 on the top substrate 200, openings 402 are formed in the regions of the cathode electrode 400 that overlap the initialization driving control lines 112 so that the initialization driving control lines 112 are exposed.

[0071] Mutual capacitances C_M between the driving electrodes 130 and the sensing electrodes 212 are formed at the points where the driving electrodes 130 and the sensing electrodes 212 cross each other. The crossing points at which the mutual capacitances C_M are formed function as sensing cells that realize touch recognition.

[0072] Here, the mutual capacitances C_M generated by the sensing cells apply a coupled sensing signal to the sensing electrodes 212 coupled to the sensing cells when a driving signal is applied to the driving electrodes 130 coupled to the sensing cells.

[0073] In addition, the driving signal may be sequentially applied to the driving electrodes 130 in one frame as described with reference to FIG. 3. That is, when the low level initialization voltage Vint is applied as the driving signal to one of the driving electrodes, a high level voltage is applied to the other driving electrodes.

[0074] Therefore, the mutual capacitances C_M are formed at the plurality of crossing points formed by the plurality of sensing electrodes 212 that cross the driving electrodes 130 to which the driving signal is applied, that is, the mutual capacitances C_M are formed at the sensing cells. When a finger (or other object) contacts the sensing cells, a change in capacitance is generated by the sensing cells, and that change may be sensed.

[0075] Therefore, according to the embodiment of the present invention, the organic light emitting display integrated with the electro-capacitive touch screen panel may be realized.

[0076] While the present invention has been described in connection with certain exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the scope of the appended claims.

Claims

1. An organic light emitting display with a touch screen panel, comprising:

   a first substrate (100);
   a plurality of pixels (120) on the first substrate, each pixel comprising an organic light emitting diode ;
   a plurality of signal lines (114, 116) and control lines (112) on the first substrate and coupled to the pixels;
   a second substrate (200) covering the first substrate; and
   first electrodes (212) of the touch screen panel on the second substrate,
   wherein the control lines comprise second electrodes (130) of the touch screen panel, and are arranged in a direction that crosses the first electrodes,
   characterised in that a cathode (400) of the OLED has openings (402) at regions that overlap the control lines, and
   wherein the cathode of the OLED is between the control lines and the first electrodes of the touch screen panel.

2. The organic light emitting display as claimed in claim 1, wherein each of the second electrodes (130) of the touch screen panel comprises a group of adjacent control lines (112).

3. The organic light emitting display as claimed in claim 1 or 2, wherein the first electrodes (212) are sensing electrodes of the touch screen panel, and wherein the second electrodes (130) are driving electrodes of the touch screen panel.

4. The organic light emitting display as claimed in claim 1, 2 or 3, wherein the first electrodes (212) are in a display region (300) of the second substrate (200) corresponding to a region of the first substrate (100) in which the pixels (120) are located.

5. The organic light emitting display as claimed in claim 4, wherein sensing lines (214) for coupling the first electrodes (212) to a touch driving circuit through a first touch pad (119a) are in a non-display region outside the display region.

6. The organic light emitting display as claimed in claim 5, wherein the control lines (112) are coupled to the touch driving circuit through a second touch pad (119b), which is in a non-display region of the first substrate (100).

7. The organic light emitting display as claimed in claim 6, wherein the first touch pad (119a) on the second substrate (200) is coupled to the same touch driving circuit as the second touch pad (119b) on the first substrate (100).

8. The organic light emitting display as claimed in any one of the preceding claims, wherein the control lines (112) comprise initialization driving control lines, which act as the second electrodes (130) of the touch screen panel, for providing an initialization voltage to the pixels (120).

9. The organic light emitting display as claimed in any one of the preceding claims, wherein each of the pixels (120) comprises:

   a pixel circuit (122) comprising:

   a first transistor configured to control an amount of current supplied to the OLED and comprising a gate electrode which is configured to be initialized by an initialization voltage; and
   a second transistor coupled between the gate electrode of the first transistor and a control line (112) of the control lines, the second transistor being configured to provide the initialization voltage to the gate electrode of the first transistor.

10. The organic light emitting display as claimed in claim 9, wherein the second transistor is configured to provide the initialization voltage from the control line (112) at a low level voltage that is lower than a voltage of data signals applied to the pixels (120).

11. The organic light emitting display as claimed in claim 10,
    wherein the control lines (112) are arranged in groups,
    wherein each of the second electrodes (130) of the touch screen panel corresponds to one of the groups of the control lines,
    pixel circuits (122), comprising the pixel circuit of each of the pixels (120), together are configured to sequentially apply the initialization voltage to the groups of the control lines.

12. The organic light emitting display as claimed in claim 11, wherein the pixel circuits (122) together are configured to apply a high level voltage to the groups of the control lines (112) excluding a group of the control lines to which the low level voltage is applied.

Patentansprüche

1. Organische lichtemittierende Anzeige mit einer Berührungsbildschirmtafel, umfassend:

ein erstes Substrat (100);
eine Mehrzahl von Pixeln (120) auf dem ersten Substrat, wobei jedes Pixel eine organische lichtemittierende Diode umfasst;
eine Mehrzahl von Signalleitungen (114, 116) und Steuerleitungen (112) auf dem ersten Substrat und gekoppelt an die Pixel;
ein zweites Substrat (200), das das erste Substrat abdeckt; und
erste Elektroden (212) der Berührungsbildschirmtafel auf dem zweiten Substrat, wobei die Steuerleitungen zweite Elektroden (130) der Berührungsbildschirmtafel umfassen und in einer Richtung angeordnet sind, die die ersten Elektroden kreuzt,
dadurch gekennzeichnet, dass eine Kathode (400) der OLED Öffnungen (402) an Bereichen aufweist, die die Steuerleitungen überlappen, und
wobei sich die Kathode der OLED zwischen den Steuerleitungen und den ersten Elektroden der Berührungsbildschirmtafel befindet.

2. Organische lichtemittierende Anzeige nach Anspruch 1,
wobei jede der zweiten Elektroden (130) der Berührungsbildschirmtafel eine Gruppe von benachbarten Steuerleitungen (112) umfasst.

3. Organische lichtemittierende Anzeige nach Anspruch 1 oder 2,
wobei die ersten Elektroden (212) Abfühlelektroden der Berührungsbildschirmtafel sind und
wobei die zweiten Elektroden (130) Treiberelektroden der Berührungsbildschirmtafel sind.

4. Organische lichtemittierende Anzeige nach Anspruch 1, 2 oder 3,
wobei sich die ersten Elektroden (212) in einem Anzeigebereich (300) des zweiten Substrats (200) befinden, der einem Bereich des ersten Substrats (100) entspricht, in dem sich die Pixel (120) befinden.

5. Organische lichtemittierende Anzeige nach Anspruch 4, wobei Abfühlleitungen (214) zum Koppeln der ersten Elektroden (212) an einen Berührungstreiberkreis durch ein erstes Berührungsfeld (119a) sich in einem Nichtanzeigebereich außerhalb des Anzeigebereiches befinden.

6. Organische lichtemittierende Anzeige nach Anspruch 5, wobei die Steuerleitungen (112) an den Berührungstreiberkreis durch ein zweites Berührungsfeld (119b) gekoppelt sind, das sich in einem Nichtanzeigebereich des ersten Substrats (100) befindet.

7. Organische lichtemittierende Anzeige nach Anspruch 6, wobei das erste Berührungsfeld (119a) auf dem zweiten Substrat (200) an denselben Berührungstreiberkreis gekoppelt ist wie das zweite Berührungsfeld (119b) auf dem ersten Substrat (100).

8. Organische lichtemittierende Anzeige nach einem der vorangehenden Ansprüche, wobei die Steuerleitungen (112) Initialisierungstreibersteuerleitungen, die als die zweiten Elektroden (130) der Berührungsbildschirmtafel dienen, zum Bereitstellen einer Initialisierungsspannung für die Pixel (120) umfassen.

9. Organische lichtemittierende Anzeige nach einem der vorangehenden Ansprüche, wobei jedes der Pixel (120) umfasst:

einen Pixelkreis (122), umfassend:

einen ersten Transistor, der so konfiguriert ist, dass er einen an die OLED gelieferten Strombetrag steuert, und eine Steuerelektrode umfasst, die so konfiguriert ist, dass sie durch eine Initialisierungsspannung initialisiert wird; und
einen zweiten Transistor, der zwischen die Steuerelektrode des ersten Transistors und eine Steuerleitung (112) der Steuerleitungen gekoppelt ist, wobei der zweite Transistor so konfiguriert ist, dass er der Steuerelektrode des ersten Transistors die Initialisierungsspannung bereitstellt.

10. Organische lichtemittierende Anzeige nach Anspruch 9, wobei der zweite Transistor so konfiguriert ist, dass er die Initialisierungsspannung aus der Steuerleitung (112) bei einer niedrigen Spannung bereitstellt, die niedriger als eine an die Pixel (120) angelegte Spannung von Datensignalen ist.

11. Organische lichtemittierende Anzeige nach Anspruch 10,
wobei die Steuerleitungen (112) in Gruppen angeordnet sind,
wobei jede der zweiten Elektroden (130) der Berührungsbildschirmtafel einer der Gruppen der Steuer-

leitungen entspricht,
Pixelkreise (122), umfassend den Pixelkreis jedes der Pixel (120), zusammen so konfiguriert sind, dass sie die Initialisierungsspannung sequentiell an die Gruppen der Steuerleitungen anlegen.

12. Organische lichtemittierende Anzeige nach Anspruch 11, wobei die Pixelkreise (122) zusammen so konfiguriert sind, dass sie an die Gruppen der Steuerleitungen (112), ausgenommen eine Gruppe der Steuerleitungen, an die die niedrige Spannung angelegt wird, eine hohe Spannung anlegen.

Revendications

1. Dispositif d'affichage électroluminescent organique ayant un panneau d'écran tactile, comprenant :

un premier substrat (100) ;
une pluralité de pixels (120) sur le premier substrat, chaque pixel comprenant une diode électroluminescente organique ;
une pluralité de lignes de signal (114, 116) et de lignes de commande (112) sur le premier substrat et couplées aux pixels ;
un deuxième substrat (200) couvrant le premier substrat ; et
des premières électrodes (212) du panneau d'écran tactile sur le deuxième substrat,
dans lequel les lignes de commande comprennent des deuxièmes électrodes (130) du panneau d'écran tactile, et sont agencées dans une direction qui croise les premières électrodes,
caractérisé en ce qu'une cathode (400) de la diode OLED possède des ouvertures (402) au niveau des régions qui se chevauchent avec les lignes de commande, et
où la cathode de la diode OLED se trouve entre les lignes de commande et les premières électrodes du panneau d'écran tactile.

2. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 1, dans lequel chacune des deuxièmes électrodes (130) du panneau d'écran tactile comprend un groupe de lignes de commande adjacentes (112).

3. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 1 ou 2,
dans lequel les premières électrodes (212) sont des électrodes de détection du panneau d'écran tactile, et
dans lequel les deuxièmes électrodes (130) sont des électrodes d'attaque du panneau d'écran tactile.

4. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 1, 2 ou 3, dans lequel les premières électrodes (212) se trouvent dans une région d'affichage (300) du deuxième substrat (200) correspondant à une région du premier substrat (100) où se situent les pixels (120).

5. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 4, dans lequel les lignes de détection (214) pour coupler les premières électrodes (212) à un circuit d'attaque tactile par l'intermédiaire d'un premier pavé tactile (119a) se trouvent dans une région de non-affichage à l'extérieur de la région d'affichage.

6. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 5, dans lequel les lignes de commande (112) sont couplées au circuit d'attaque tactile par l'intermédiaire d'un deuxième pavé tactile (119b), qui se trouve dans une région de non-affichage du premier substrat (100).

7. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 6, dans lequel le premier pavé tactile (119a) sur le deuxième substrat (200) est couplé au même circuit d'attaque tactile comme le deuxième pavé tactile (119b) sur le premier substrat (100).

8. Dispositif d'affichage électroluminescent organique tel que revendiqué dans l'une quelconque des revendications précédentes, dans lequel les lignes de commande (112) comprennent des lignes de commande d'attaque d'initialisation, qui agissent comme étant les deuxièmes électrodes (130) du panneau d'écran tactile, pour fournir une tension d'initialisation aux pixels (120).

9. Dispositif d'affichage électroluminescent organique tel que revendiqué dans l'une quelconque des revendications précédentes, dans lequel chacun des pixels (120) comprend :

un circuit de pixel (122) comprenant :

un premier transistor configuré pour réguler une quantité de courant fournie à la diode OLED et comprenant une électrode de grille qui est configurée pour être initialisée par une tension d'initialisation ; et
un deuxième transistor couplé entre l'électrode de grille du premier transistor et une ligne de commande (112) des lignes de commande, le deuxième transistor étant configuré pour fournir la tension d'initialisation à l'électrode de grille du premier transistor.

10. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 9, dans le-

quel le deuxième transistor est configuré pour fournir la tension d'initialisation à partir de la ligne de commande (112) à une tension de niveau bas qui est inférieure à une tension de signaux de données appliquée aux pixels (120).

11. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 10, dans lequel les lignes de commande (112) sont agencées en groupes,
dans lequel chacune des deuxièmes électrodes (130) du panneau d'écran tactile correspond à l'un des groupes des lignes de commande,
les circuits de pixels (122), comprenant le circuit de pixel de chacun des pixels (120), sont configurés ensemble pour appliquer séquentiellement la tension d'initialisation aux groupes des lignes de commande.

12. Dispositif d'affichage électroluminescent organique tel que revendiqué dans la revendication 11, dans lequel les circuits de pixels (122) sont configurés ensemble pour appliquer une tension de niveau haut aux groupes des lignes de commande (112) à l'exclusion d'un groupe des lignes de commande auquel la tension de niveau bas est appliquée.

FIG. 1

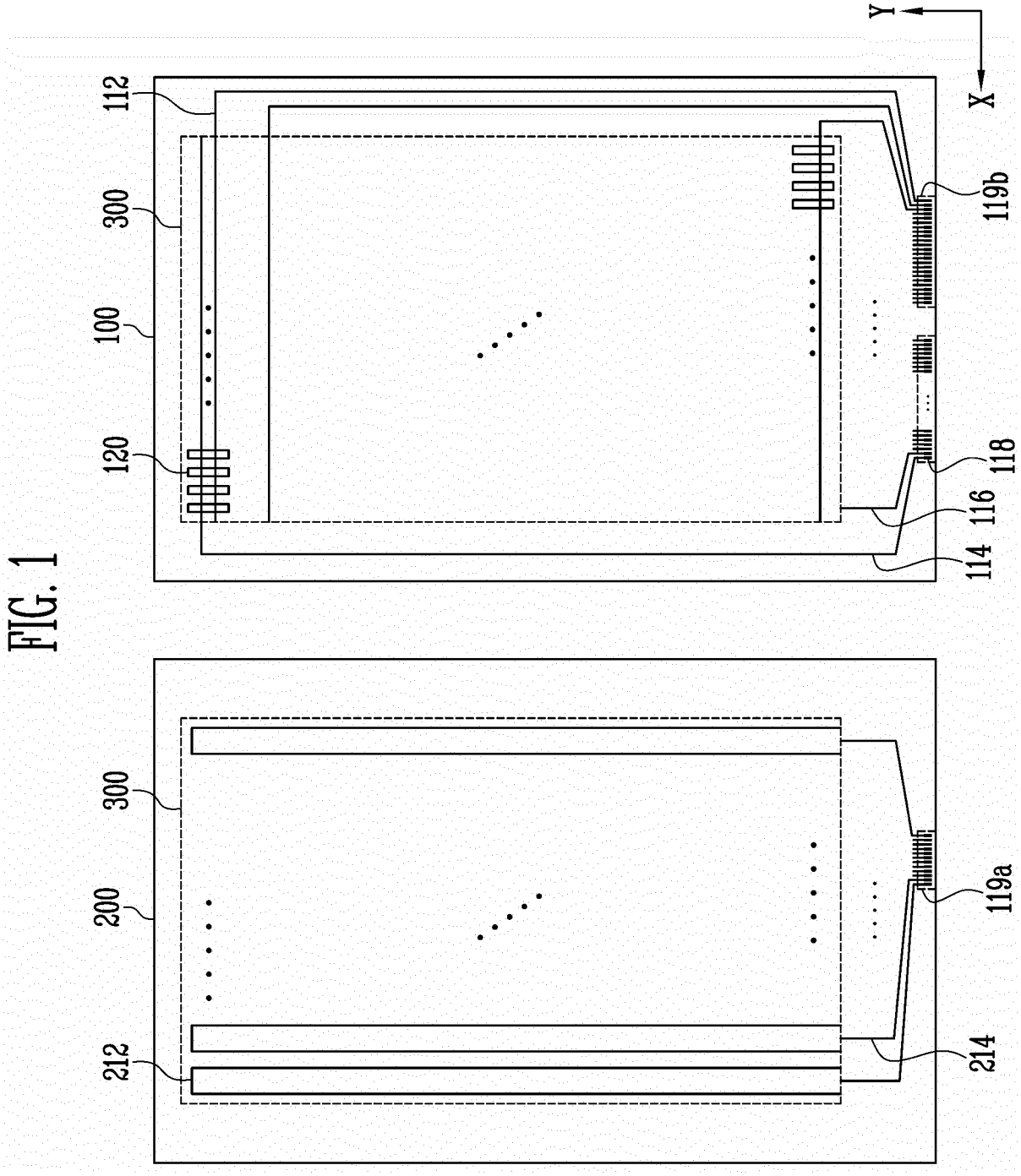


FIG. 2

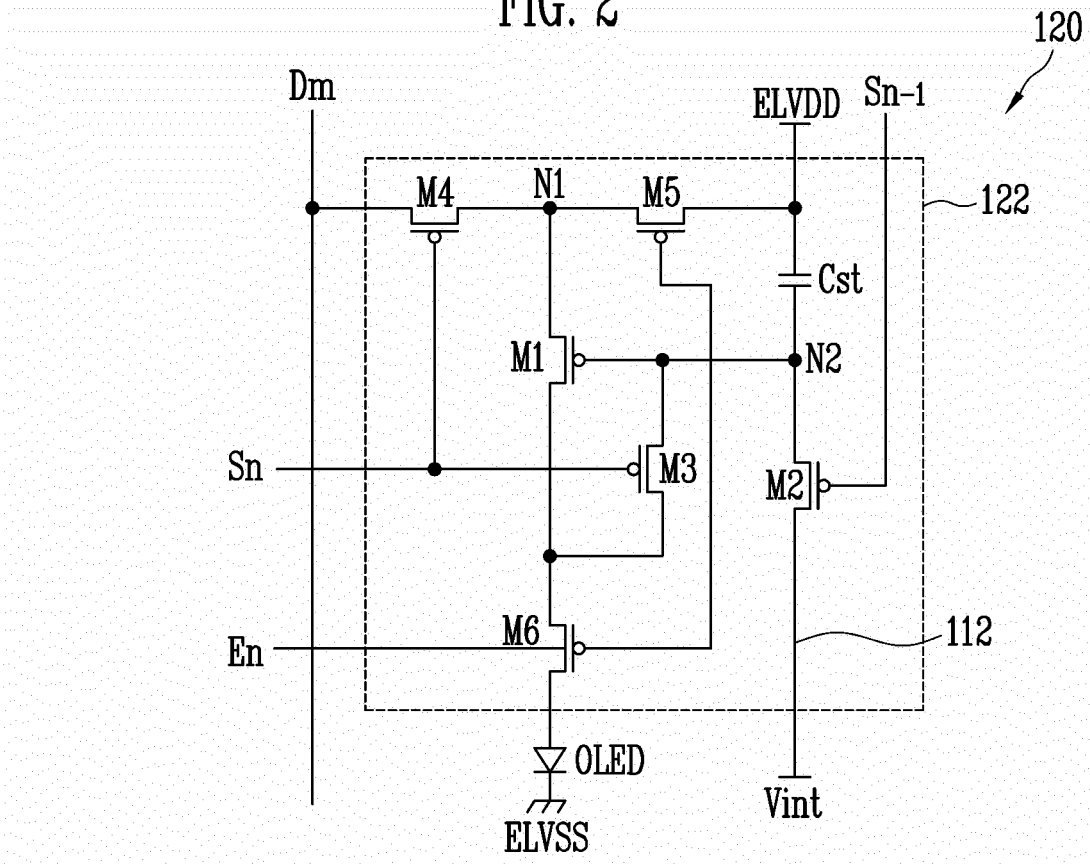

120
Dm
ELVDD
Sn-1
M4
N1
M5
122
Cst
M1
N2
Sn
M3
M2
M6
112
En
OLED
Vint
ELVSS

FIG. 3

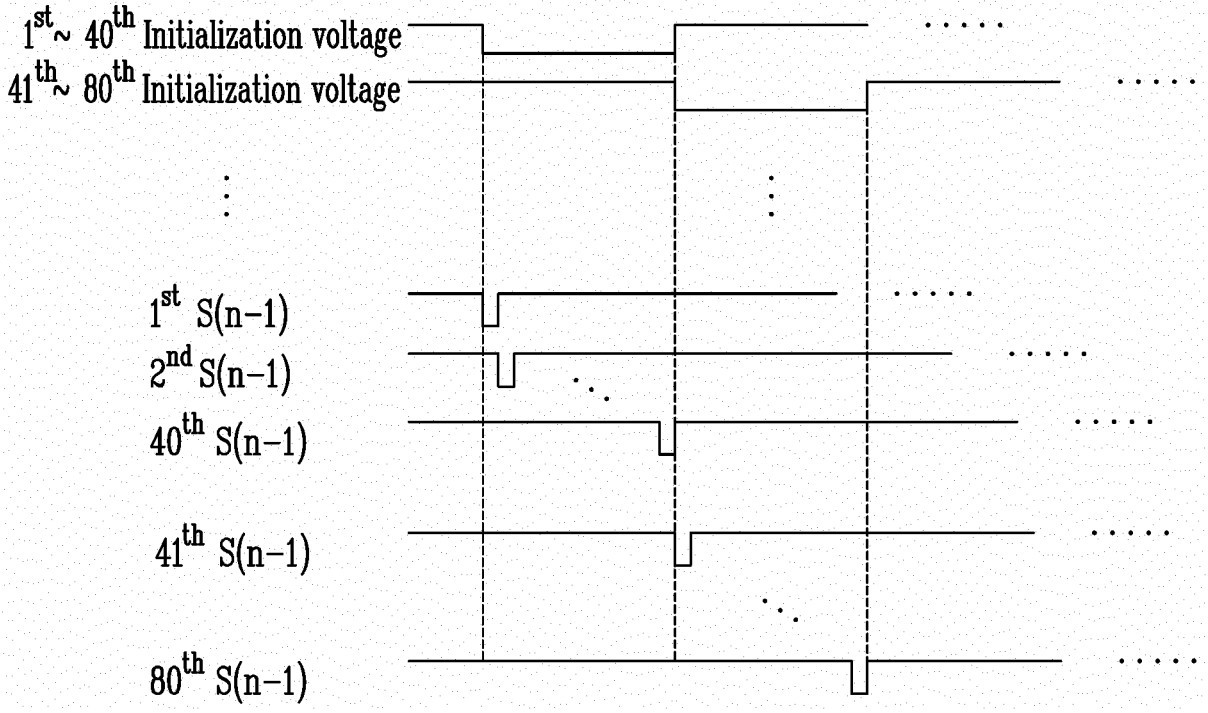
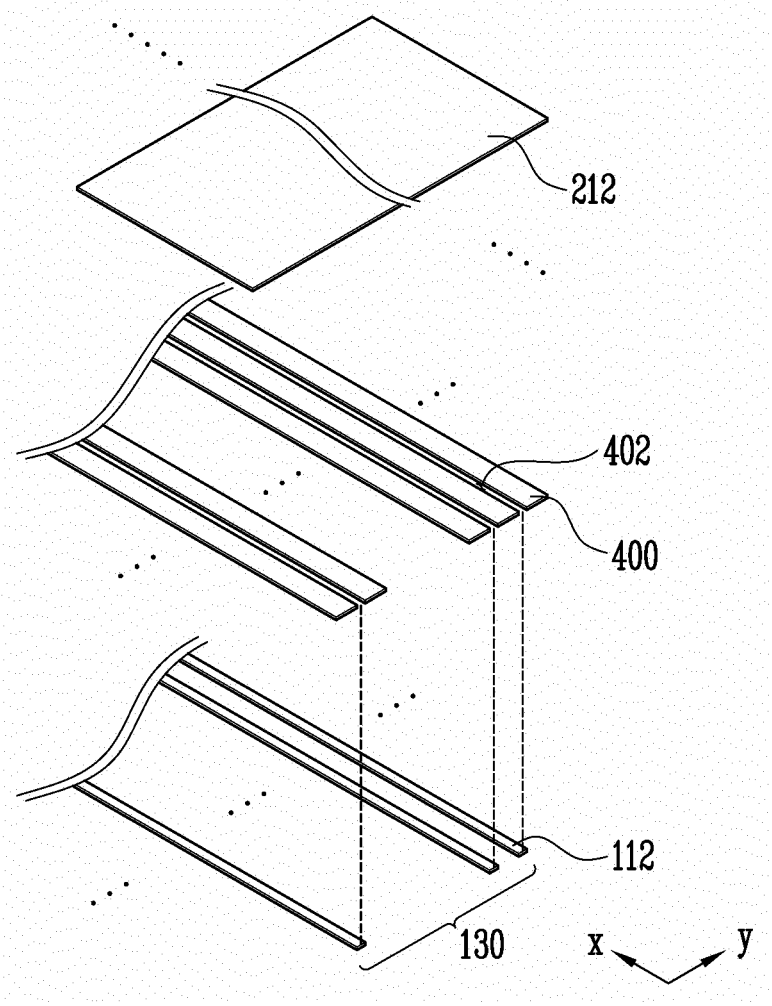

1st~ 40th Initialization voltage
41th~ 80th Initialization voltage
1st S(n-1)
2nd S(n-1)
40th S(n-1)
41th S(n-1)
80th S(n-1)

FIG. 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2011175846 A **[0006]**
- US 2012105381 A **[0007]**
- US 2011316802 A **[0008]**
- EP 1496495 A **[0009]**

专利名称(译)	有机发光显示器与触摸屏面板集成		
公开(公告)号	EP2672515B1	公开(公告)日	2017-08-02
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[标]申请(专利权)人(译)	三星显示有限公司		
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发明人	JEON, MU-KYUNG		
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优先权	1020120059818 2012-06-04 KR		
其他公开文献	EP2672515A1		
外部链接	Espacenet		

摘要(译)

一种带有触摸屏面板的有机发光显示器，包括第一基板（100）;第一基板上的多个像素（120）;多个信号线（114,116）和控制线（112）在第一基板上并耦合到像素;覆盖第一基板的第二基板（200）;第二基板上的触摸屏面板的第一电极（212）。这里，控制线（112）是触摸屏面板的第二电极，并且布置在与第一电极（212）交叉的方向上。