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(54) **Organic light emitting diode display and driving method thereof**

Organische lichtemittierende Diodenanzeige und Verfahren zu ihrer Ansteuerung

Affichage à diodes électroluminescentes organiques et procédé de commande correspondant

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## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

[0001] The present invention relates to an organic light emitting diode display and a driving method thereof, and more particularly, to an organic light emitting diode display and a driving method thereof, in which an image is displayed with uniform brightness.

#### 2. Description of the Related Art

[0002] Various flat panel displays have recently been developed as alternatives to a relatively heavy and bulky cathode ray tube (CRT) display. The flat panel display includes a liquid crystal display (LCD), a field emission display (FED), a plasma display panel (PDP), an organic light emitting diode display (OLED), *etc.*

[0003] Among the flat panel displays, the organic light emitting diode display can emit light for itself by electron-hole recombination. Such an organic light emitting diode display has advantages in that response time is relatively fast and power consumption is relatively low. Generally, the organic light emitting diode display employs a transistor provided in each pixel for supplying current corresponding to a data signal to a light emitting device, thereby allowing the light emitting device to emit light.

[0004] FIG. 1 illustrates a conventional organic light emitting diode display.

[0005] Referring to FIG. 1, a conventional organic light emitting diode display includes a pixel portion 30 including a plurality of pixels 40 formed in a region defined by intersection of scan lines S1 through Sn and data lines D1 through Dm; a scan driver 10 to drive the scan lines S 1 through Sn; a data driver 20 to drive the data lines D1 through Dm; and a timing controller 50 to control the scan driver 10 and the data driver 20.

[0006] The scan driver 10 generates scan signals in response to a scan control signal SCS from the timing controller 50, and supplies the scan signals to the scan lines S1 through Sn in sequence. Further, the scan driver 10 generates emission control signals in response to the scan control signal SCS, and supplies the emission control signals to emission control lines E1 through En in sequence.

[0007] The data driver 20 generates data signals in response to data control signal DCS from the timing controller 50, and supplies the data signals to the data lines D 1 through Dm. At this time, the data driver 20 supplies the data signals corresponding to one horizontal line to the data lines D1 through Dm per one horizontal period.

[0008] The timing controller 50 generates the data control signal DCS and the scan control signal SCS corresponding to an external synchronization signal. The data control signal DCS and the scan control signal SCS are supplied from the timing controller 50 to the data driver

20 and the scan driver 10, respectively. Further, the timing controller 50 rearranges external data and supplies it to the data driver 20.

[0009] The pixel portion 30 receives first power ELVDD and second power ELVSS from an external power source, and supplies them to the respective pixels 40. When the first power ELVDD and the second power ELVSS are applied to the pixels 40, each pixel 40 displays an image corresponding to the received data signal. Here, emission time of each pixel 40 is controlled corresponding to the emission control signal.

[0010] Like the scan signals, the emission control signals are supplied to the 1<sup>st</sup> through nth emission control lines En, in sequence. Here, every pixel 40 included in the pixel portion 30 does not emit light for a short time while the emission control signal is not supplied.

[0011] However, the first power ELVDD applied to the pixel portion 30 varies according to how many pixels 40 emit light, *i.e.*, according to a pattern and brightness of an image displayed on the pixel portion 30. That is, the first power ELVDD supplied per frame is differently loaded to the pixels 40 according to how many pixels 40 emit light. For example, when relatively many pixels 40 emit light during one frame, the relatively high first power ELVDD is loaded to the pixels 40. On the other hand, when relatively small pixels 40 emit light during one frame, the relatively low first power ELVDD is loaded to the pixels 40. Therefore, voltage difference corresponding to the pattern of an image arises between the pixels 40 receiving the first power ELVDD 40, and thus there is a problem in that the image is displayed with non-uniform brightness. Further, due to voltage drop, the voltage of the first power ELVDD is differently applied to the pixels 40 according to the positions of the pixels 40 formed in the pixel portion 30, and thus the image is displayed with non-uniform brightness.

US 2004/113873 A1 discloses an organic light emitting diode display device using a current programming method. Emission of the OLEDs is controlled by switching a positive power supply voltage.

US 2004/189627 A1 discloses an organic light emitting diode display device in which a power supply voltage is switched between a high voltage and a low voltage in a select period and a holding period, respectively.

US 2004/095298 A1 deals with an OLED display device wherein each pixel circuit in addition to an ordinary power supply lines is connected to a switched power supply line. US 2002/195968 A1 provides another example of an organic light emitting diode display device wherein a current programming method is used and wherein light emission is controlled by switching a power supply voltage.

### SUMMARY OF THE INVENTION

[0012] Accordingly, it is an aspect of the present invention to provide an organic light emitting diode display as set forth in claim 1 and a driving method thereof as set forth in claim 17, in which an image is displayed with

uniform brightness. Preferred embodiments of the invention are subject of the dependent claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0013]** A more complete appreciation of the invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

**[0014]** FIG. 1 is a layout diagram of a conventional organic light emitting diode display;

**[0015]** FIG. 2 illustrates a driving method for an organic light emitting diode display according to an embodiment of the present invention;

**[0016]** FIG 3 shows pixels that do not emit light depending on the driving method illustrated in FIG 2;

**[0017]** FIG 4 is a layout diagram of an organic light emitting diode display according to a first embodiment of the present invention;

**[0018]** FIG 5 shows waveforms of scan signals supplied from a scan driver of FIG 4;

**[0019]** FIG 6 is a circuit diagram of a pixel according to an embodiment of the present invention;

**[0020]** FIG. 7 is a layout diagram of an organic light emitting diode display according to a second embodiment of the present invention;

**[0021]** FIG 8 shows waveforms of control signal supplied to transistors of FIG. 7;

**[0022]** FIG 9 is a layout diagram of an organic light emitting diode display according to a third embodiment of the present invention;

**[0023]** FIG. 10 shows waveforms of emission control signal supplied to emission control lines of FIG 9;

**[0024]** FIG. 11 is a layout diagram of an organic light emitting diode display according to a fourth embodiment of the present invention;

**[0025]** FIG. 12 is a layout diagram of an organic light emitting diode display according to a fifth embodiment of the present invention;

**[0026]** FIG. 13 is a circuit diagram of a pixel according to another embodiment of the present invention; and

**[0027]** FIG 14 illustrates a driving method for the pixel of FIG. 13.

### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0028]** Hereinafter, preferable embodiments according to the present invention will be described with reference to the accompanying drawings, wherein the preferred embodiments of the present invention are provided to be readily understood by those skilled in the art.

**[0029]** FIG. 2 illustrates a driving method for an organic light emitting diode display according to an embodiment of the present invention.

**[0030]** Referring to FIG 2, an organic light emitting diode display according to an embodiment of the present invention is driven dividing one frame F into a plurality of sub-frames SF. For example, one frame F according to an embodiment of the present invention is divided into  $i$  sub-frames SF (where,  $i$  is a natural number). During each sub-frame SF, some pixels do not emit light, and the rest of the pixels emit light. Here, some pixels that do not emit light receive data signals during the sub-frame SF.

**[0031]** According to an embodiment of the present invention, the pixels that receive the data signal, *i.e.*, the pixels that do not emit light are set differently from each other during each sub-frame SF of one frame. For example, the pixels, which receive the data signal during the 1<sup>st</sup> sub-frame 1SF, do not receive the data signal during the 2<sup>nd</sup> sub-frame 2SF through the  $i^{\text{th}}$  sub-frame  $i$ SF. That is, the pixels according to an embodiment of the present invention do not emit light during one sub-frame among  $i$  sub-frames SF, and emit light during the rest of sub-frames. Alternatively, the pixels according to an embodiment of the present invention may not emit light during one or more sub-frames.

**[0032]** Hence, the number of pixels that do not emit light during each sub-frame is set as  $1/i$  of the total number of pixels. For example, if one frame F is divided into four sub-frames and the total number of pixels provided in a pixel portion is 4,000, one thousand pixels do not emit light during each sub-frame. Meanwhile, if one frame is divided into two sub-frames, a time during which the pixels do not emit light becomes longer, so that a flicker is likely to arise. Therefore, it is preferable that one frame is divided into three or more sub-frames.

**[0033]** FIG 3 shows pixels which do not emit light depending on the driving method illustrated in FIG. 2. For the sake of convenience and example, it will be herein below assumed that the pixel portion includes  $n$  scan lines S 1 through S $n$  and one frame is divided into four sub-frames SF.

**[0034]** Referring to FIG 3, one frame F is divided into four sub-frames, and thus pixels connected to different scan lines are set as a non-emission state per sub-frame. In other words, the pixels corresponding to non-emission are set differently per sub-frame.

**[0035]** During the 1<sup>st</sup> sub-frame 1SF, the pixels connected to the 1<sup>st</sup> scan line S1, the 5<sup>th</sup> scan line S5 ( $((i+1)^{\text{th}}$  scan line), the 9<sup>th</sup> scan line S9 ( $((2i+1)^{\text{th}}$  scan line), ..., the  $(n-3)^{\text{th}}$  scan line S $n-3$  are set as the non-emission state. Further, the data signals are supplied during the 1<sup>st</sup> sub-frame 1SF to the pixels connected to the 1<sup>st</sup> scan line S1, the 5<sup>th</sup> scan line S5, the 9<sup>th</sup> scan line S9, ..., the  $(n-3)^{\text{th}}$  scan line S $n-3$ .

**[0036]** During the 2<sup>nd</sup> sub-frame 2SF, the pixels connected to the 2<sup>nd</sup> scan line S2, the 6<sup>th</sup> scan line S6 ( $((i+2)^{\text{th}}$  scan line), the 10<sup>th</sup> scan line S10 ( $((2i+2)^{\text{th}}$  scan line), ..., the  $(n-2)^{\text{th}}$  scan line S $n-2$  are set as the non-emission state. Further, the data signals are supplied during the 2<sup>nd</sup> sub-frame 2SF to the pixels connected to the 2<sup>nd</sup>

scan line S2, the 6<sup>th</sup> scan line S6, the 10<sup>th</sup> scan line S10, ..., the (n-2)<sup>th</sup> scan line Sn-2.

**[0037]** During the 3<sup>rd</sup> sub-frame 3SF, the pixels connected to the 3<sup>rd</sup> scan line S3, the 7<sup>th</sup> scan line S7 ((i+3)<sup>th</sup> scan line), the 11<sup>th</sup> scan line S11 ((2i+3)<sup>th</sup> scan line), ..., the (n-1)<sup>th</sup> scan line Sn-1 are set as the non-emission state. Further, the data signals are supplied during the 3<sup>rd</sup> sub-frame 3SF to the pixels connected to the 3<sup>rd</sup> scan line S3, the 7<sup>th</sup> scan line S7, the 11<sup>th</sup> scan line S11 ((2i+3)<sup>th</sup> scan line), ..., the (n-1)<sup>th</sup> scan line Sn-1.

**[0038]** During the 4<sup>th</sup> sub-frame 4SF, the pixels connected to the 4<sup>th</sup> scan line S4, the 8<sup>th</sup> scan line S8 (2<sup>i</sup><sup>th</sup> scan line), the 12<sup>th</sup> scan line S12 (3<sup>i</sup><sup>th</sup> scan line), ..., the n<sup>th</sup> scan line Sn are set as the non-emission state. Further, the data signals are supplied during the 3<sup>rd</sup> sub-frame 3SF to the pixels connected to the 4<sup>th</sup> scan line S4, the 8<sup>th</sup> scan line S8, the 12<sup>th</sup> scan line S12, ..., the n<sup>th</sup> scan line Sn.

**[0039]** Thus, according to an embodiment of the present invention, one frame F is divided into a plurality of sub-frames SF, and the data signals are supplied to the pixels different per sub-frame. Here, the pixels receiving the data signal are set as the non-emission state during each sub-frame SF. As the pixels receiving the data signal are set as the non-emission state, the pixels display an image with uniform brightness, which will be described later.

**[0040]** FIG. 4 is a layout diagram of an organic light emitting diode display according to a first embodiment of the present invention.

**[0041]** Referring to FIG. 4, an organic light emitting diode display according to a first embodiment of the present invention includes a pixel portion 130 including a plurality of pixels 140 formed in a region intersected by scan lines S1 through Sn and data lines D1 through Dm; a scan driver 110 to driver the scan lines S1 through Sn; a data driver 120 to drive the data lines D1 through Dm; and a timing controller 150 to control the scan driver 110 and the data driver 120.

**[0042]** The timing controller 150 generates a data control signal DCS and a scan control signal SCS in response to external synchronization signals, and supplies the data control signal DCS and the scan control signal SCS to the data driver 120 and the scan driver 110, respectively. Further, the timing controller 150 rearranges external data and supplies it to the data driver 120.

**[0043]** The scan driver 110 generates scan signals in response to the scan control signals SCS from the timing controller 150, and supplies them to the scan lines S. Here, the scan driver 110 sequentially supplies the scan signals to the scan lines S connected to the pixels 140 that receives the data during each sub-frame, *i.e.*, which are set as the non-emission state. For example, in a case where the pixel portion 130 is formed with n scan lines S1 through Sn, the scan driver 110 supplies the scan signals to n/i scan lines S during each sub-frame.

**[0044]** That is, the scan driver 110 supplies the scan signals to some scan lines S in sequence during each

sub-frame. Here, the scan lines S receiving the scan signals are differently set per each sub-frame. For example, when the pixels are set as the non-emission state during the sub-frames as shown in FIG. 3, the scan driver 110 supplies the scan signals as shown in FIG 5.

**[0045]** In more detail, the scan driver 110 supplies the scan signals to the 15<sup>st</sup> scan line S1, the 5<sup>th</sup> scan line S5, the 9<sup>th</sup> scan line S9, ..., the (n-3)<sup>th</sup> scan line Sn-3 in sequence during the 1<sup>st</sup> sub-frame 1 SF. Further, the scan driver 110 supplies the scan signals to the 2<sup>nd</sup> scan line S2, the 6<sup>th</sup> scan line S6, the 10<sup>th</sup> scan line S10, ..., the (n-2)<sup>th</sup> scan line Sn-2 in sequence during the 2<sup>nd</sup> sub-frame 2SF. Also, the scan driver 110 supplies the scan signals to the 3<sup>rd</sup> scan line S3, the 7<sup>th</sup> scan line S7, the 11<sup>th</sup> scan line S11, ..., the (n-1)<sup>th</sup> scan line Sn-1 in sequence during the 3<sup>rd</sup> sub-frame 3SF. Further, the scan driver 110 supplies the scan signals to the 4<sup>th</sup> scan line S4, the 8<sup>th</sup> scan line S8, the 12<sup>th</sup> scan line S12, ..., the (n)<sup>th</sup> scan line Sn in sequence during the 4<sup>th</sup> sub-frame 4SF.

**[0046]** The data driver 120 generates data signals in response to the data control signals DCS from the timing controller 150, and supplies them to the data lines D1 through Dm in sequence. Here, the data driver 120 supplies the data signals corresponding to the scan signals supplied from the scan driver 110. That is, the data driver 120 supplies the data signals to the pixels 130 which do not emit light during each sub-frame.

**[0047]** For example, the data driver 120 supplies the data signals to the pixels 140 connected to the 1<sup>st</sup> scan line S1, the 5<sup>th</sup> scan line S5, the 9<sup>th</sup> scan line S9, ..., the (n-3)<sup>th</sup> scan line Sn-3 in correspondence to the scan signals supplied in sequence during the 1<sup>st</sup> sub-frame 1SF. Further, the scan driver 110 supplies the data signals to the pixels 140 connected to the 2<sup>nd</sup> scan line S2, the 6<sup>th</sup> scan line S6, the 10<sup>th</sup> scan line S10, ..., the (n-2)<sup>th</sup> scan line Sn-2 in correspondence to the scan signals supplied in sequence during the 2<sup>nd</sup> sub-frame 2SF. Also, the scan driver 110 supplies the data signals to the pixels 140 connected to the 3<sup>rd</sup> scan line S3, the 7<sup>th</sup> scan line S7, the 11<sup>th</sup> scan line S11, ..., the (n-1)<sup>th</sup> scan line Sn-1 in correspondence to the scan signals supplied in sequence during the 3<sup>rd</sup> sub-frame 3SF. Further, the scan driver 110 supplies the data signals to the pixels 140 connected to the 4<sup>th</sup> scan line S4, the 8<sup>th</sup> scan line S8, the 12<sup>th</sup> scan line S12, ..., the (n)<sup>th</sup> scan line Sn in correspondence to the scan signals supplied in sequence during the 4<sup>th</sup> sub-frame 4SF.

**[0048]** The pixel portion 130 receives external first power ELVDD and external second power ELVSS through a first power line ELVDD and a second power line ELVSS, respectively. Here, the first power line ELVDD is divided into a plurality of power lines corresponding to the number of sub-frames. For example, in a case where one frame is divided into four sub-frames, the first power line ELVDD is divided into a first divided power line ELVDD1, a second divided power line ELVDD2, a third divided power line ELVDD3, and a fourth

divided power line ELVDD4. At this time, the first, second, third and fourth divided power ELVDD1, ELVDD2, ELVDD3 and ELVDD4 are set to have the same voltage level as the first power ELVDD.

**[0049]** The first divided power line ELVDD1 is connected to the pixels that receive the data signals during the 1<sup>st</sup> sub-frame. The second divided power line ELVDD2 is connected to the pixels that receive the data signals during the 2<sup>nd</sup> sub-frame. The third divided power line ELVDD3 is connected to the pixels that receive the data signals during the 3<sup>rd</sup> sub-frame. The fourth divided power line ELVDD4 is connected to the pixels that receive the data signals during the 4<sup>th</sup> sub-frame.

**[0050]** The pixels 140, connected between one of the first through fourth divided power lines ELVDD1 through ELVDD4 and a second power line ELVSS, receive the data signals during one of the plurality of sub-frames, and display an image corresponding to the data signal during the rest of the sub-frames.

**[0051]** FIG 6 is a circuit diagram of a pixel according to an embodiment of the present invention. For the sake of convenience, the pixel connected to the m<sup>th</sup> data line Dm and the n<sup>th</sup> scan line Sn will be exemplarily described. Hence, the pixel shown in FIG. 6 is connected with the fourth divided power ELVDD4.

**[0052]** Referring to FIG. 6, each pixel 140 according to an embodiment of the present invention includes a pixel circuit 142 connected with the light emitting device OLED, the data line Dm, the scan line Sn, and the emission control line En, and controlling the light emitting device OLED.

**[0053]** The light emitting device OLED includes an anode electrode connected to the pixel circuit 142 and a cathode electrode connected to the second power line ELVSS. Here, the light emitting device OLED emits light corresponding to current supplied from the pixel circuit 142.

**[0054]** The pixel circuit 142 includes a first transistor M1, a second transistor M2, a third transistor M3 and a capacitor Cst. The first transistor M1 is turned on when the scan signal is supplied to the n<sup>th</sup> scan line Sn. When the first transistor M1 is turned on, the data signal is supplied from the data line Dm to the capacitor Cst. At this time, the capacitor Cst is charged with voltage corresponding to the data signal when the first transistor M1 is turned on.

**[0055]** The second transistor M2 supplies current corresponding to the voltage charged in the capacitor Cst to the third transistor M3. Here, the third transistor M3 is connected between the second transistor M2 and the light emitting device OLED. Further, the third transistor M3 is turned off for a period of time while the emission control signal is supplied, and turned on the rest of periods.

**[0056]** As shown in FIG. 6, the pixel 140 is maintained as the non-emission state during the 4<sup>th</sup> sub-frame 4SF while receiving the data signal. Substantially, all pixels 140 connected to the fourth divided power line ELVDD4

do not emit light during the 4<sup>th</sup> sub-frame 4SF. Then, the current does not flow in the fourth divided power line ELVDD4 during the 4<sup>th</sup> sub-frame 4SF, so that there is no voltage drop in the fourth divided power line ELVDD4.

5 As there is no voltage drop in the fourth divided power line ELVDD4 during the 4<sup>th</sup> sub-frame 4SF, the capacitors C of the pixels 140 receiving the data signals during the 4<sup>th</sup> sub-frame 4SF are charged with the voltage correctly corresponding to the data signal without loss.

10 **[0057]** Meanwhile, while the pixels 140 receiving the data signal during the 4<sup>th</sup> sub-frame 4SF emit light, a predetermined current flows in the fourth divided power line ELVDD4 and thus the voltage drop arises in the fourth divided power line ELVDD4. As the voltage drop arises in the fourth divided power line ELVDD4, voltage applied to a gate electrode of the second transistor M2 connected to the fourth divided power line ELVDD4 via the capacitor Cst varies corresponding to the voltage drop in the fourth divided power line ELVDD4. In other words, the coupling effect of the capacitor Cst causes the voltage applied to the gate electrode of the second transistor M2 to vary corresponding to the voltage drop in the fourth divided power line ELVDD4. Then, voltage difference between the gate electrode and a source electrode of the second transistor M2 is uniformly maintained regardless of the voltage drop in the fourth divided power ELVDD4. Thus, according to an embodiment of the present invention, an image is displayed with uniform brightness depending on the voltage charged in the capacitor Cst.

20 **[0058]** According to an embodiment of the present invention, one frame is divided into one or more sub-frames, and the pixels receiving the data signal during the sub-frame are maintained in the non-emission state, thereby displaying an image with uniform brightness. Here, various methods can be used to maintain the pixels in the non-emission state.

25 **[0059]** For example, the voltage levels of the first divided power ELVDD1, the second divided power ELVDD2, the third divided power ELVDD3 and the fourth divided power ELVDD4 are used to set the pixel 140 as the non-emission state.

30 **[0060]** During the 1<sup>st</sup> sub-frame 1SF, the voltage level of the first divided power ELVDD1 can be lowered to make the light emitting device OLED to not emit light. For example, the first divided power ELVDD1 can be set to have the same voltage level as the second power ELVSS during the 1<sup>st</sup> sub-frame 1SF. Thus, the first divided power ELVDD1 is lowered during the 1<sup>st</sup> sub-frame 1SF, so that the pixels 140 connected to the first divided power line ELVDD1 do not emit light.

35 **[0061]** During the 2<sup>nd</sup> sub-frame 2SF, the voltage level of the second divided power ELVDD2 can be lowered to make the light emitting device OLED to not emit light. For example, the second divided power ELVDD2 can be set to have the same voltage level as the second power ELVSS during the 2<sup>nd</sup> sub-frame 2SF. In the meantime, the voltage level of the first divided power ELVDD1 is increased during the 2<sup>nd</sup> sub-frame 2SF, so that the light

emitting device OLED emits light.

**[0062]** Likewise, the voltage level of third divided power ELVDD3 is lowered during the 3<sup>rd</sup> sub-frame, and the voltage level of the fourth divided power ELVDD4 is lowered during the 4<sup>th</sup> sub-frame, thereby maintaining some pixels in the non-emission state during a predetermined sub-frame.

**[0063]** FIG. 7 is a layout diagram of an organic light emitting diode display according to a second embodiment of the present invention.

**[0064]** Referring to FIG 7, the organic light emitting diode display according to the second embodiment of the present invention additionally includes first through fourth transistors M11 through M14 respectively connected to the first through fourth divided power lines ELVDD1 through ELVDD4 in order to maintain some pixels in the non-emission state during a predetermined sub-frame.

**[0065]** The first transistor M11 is connected to the first divided power line ELVDD1. Here, the first transistor M11 is turned off during the 1<sup>st</sup> sub-frame in response to an external first control signal CS1 (refer to FIG 8), and turned on during the rest of frames 2SF through 4SF. Thus, the pixels connected to the first divided power line ELVDD1 do not emit light during the 1<sup>st</sup> sub-frame 1 SF.

**[0066]** The second transistor M12 is connected to the second divided power line ELVDD2. Here, the second transistor M12 is turned off during the 2<sup>nd</sup> sub-frame in response to an external second control signal CS2 (refer to FIG. 8), and turned on during the rest of frames 1SF, 3SF and 4SF. Thus, the pixels connected to the second divided power line ELVDD2 do not emit light during the 2<sup>nd</sup> sub-frame 2SF.

**[0067]** The third transistor M13 is connected to the third divided power line ELVDD3. Here, the third transistor M13 is turned off during the 3<sup>rd</sup> sub-frame in response to an external third control signal CS3 (refer to FIG 8), and turned on during the rest of the frames 1SF, 2SF and 4SF. Thus, the pixels connected to the third divided power line ELVDD3 do not emit light during the 3<sup>rd</sup> sub-frame 3SF.

**[0068]** The fourth transistor M14 is connected to the fourth divided power line ELVDD4. Here, the fourth transistor M14 is turned off during the 4<sup>th</sup> sub-frame in response to an external fourth control signal CS4 (refer to FIG. 8), and turned on during the rest of the frames 1SF through 3SF. Thus, the pixels connected to the fourth divided power line ELVDD4 do not emit light during the 4<sup>th</sup> sub-frame 4SF.

**[0069]** FIG. 9 is a layout diagram of an organic light emitting diode display according to a third embodiment of the present invention.

**[0070]** Referring to FIG 9, the organic light emitting diode display according to the third embodiment of the present invention includes four emission control lines E1 through E4 corresponding to the four sub-frames.

**[0071]** The first emission control line E1 is connected to the pixels receiving the data signal during the 1<sup>st</sup> sub-frame 1SF. Here, the first emission control line E1 re-

ceives an emission control signal (refer to FIG. 10) during the 1<sup>st</sup> sub-frame 1SF. Then, the third transistor M3 connected to the first emission control line E1 is turned off. That is, the pixels receiving the data signals during the 1<sup>st</sup> sub-frame 1SF are set as the non-emission state by the emission control signal supplied to the first emission control line E1.

**[0072]** The second emission control line E2 is connected to the pixels receiving the data signal during the 2<sup>nd</sup> sub-frame 2SF. Here, the second emission control line E2 receives the emission control signal (refer to FIG. 10) during the 2<sup>nd</sup> sub-frame 2SF. Then, the second transistor M2 connected to the second emission control line E2 is turned off. That is, the pixels receiving the data signals during the 2<sup>nd</sup> sub-frame 2SF are set as the non-emission state by the emission control signal supplied to the second emission control line E2.

**[0073]** The third emission control line E3 is connected to the pixels receiving the data signal during the 3<sup>rd</sup> sub-frame 3SF. Here, the third emission control line E3 receives the emission control signal (refer to FIG. 10) during the 3<sup>rd</sup> sub-frame 3SF. Then, the third transistor M3 connected to the third emission control line E3 is turned off. That is, the pixels receiving the data signals during the 3<sup>rd</sup> sub-frame 3SF are set as the non-emission state by the emission control signal supplied to the third emission control line E3.

**[0074]** The fourth emission control line E4 is connected to the pixels receiving the data signal during the 4<sup>th</sup> sub-frame 4SF. Here, the fourth emission control line E4 receives the emission control signal (refer to FIG 10) during the 4<sup>th</sup> sub-frame 4SF. Then, the fourth transistor M4 connected to the fourth emission control line E4 is turned off. That is, the pixels receiving the data signals during the 4<sup>th</sup> sub-frame 4SF are set as the non-emission state by the emission control signal supplied to the fourth emission control line E4.

**[0075]** Further, according to an embodiment of the present invention, the pixel can be controlled to have the non-emission state, using the second power ELVSS.

**[0076]** FIG. 11 is a layout diagram of an organic light emitting diode display according to a fourth embodiment of the present invention.

**[0077]** Referring to FIG. 11, in the organic light emitting diode display according to the fourth embodiment of the present invention, the second power line ELVSS can be divided into a fifth divided power ELVSS1, sixth divided power ELVSS2, seventh divided power ELVSS3, and eighth divided power ELVSS4. Here, the fifth through eighth divided power ELVSS1 through ELVSS4 have the same voltage level as the second power ELVSS. That is, the voltage levels of the fifth through eighth divided power lines ELVSS1 through ELVSS4, connected to the cathode electrode of the light emitting device OLED, are set to be lower than those of the first through fourth divided power lines ELVDD1 through ELVDD4, connected to the anode electrode of the light emitting device OLED.

**[0078]** The fifth divided power line ELVSS1 is connect-

ed to the pixels receiving the data signal during the 1<sup>st</sup> sub-frame 1SF. The sixth divided power line ELVSS2 is connected to the pixels receiving the data signal during the 2<sup>nd</sup> sub-frame 2SF. The seventh divided power line ELVSS3 is connected to the pixels receiving the data signal during the 3<sup>rd</sup> sub-frame 3SF. The eighth divided power ELVSS4 is connected to the pixels receiving the data signal during the 4<sup>th</sup> sub-frame.

**[0079]** In the organic light emitting diode display according to the fourth embodiment of the present invention, the fifth through eighth divided power ELVSS1 through ELVSS4 are used for controlling the pixels to have the non-emission state during the respective sub-frames.

**[0080]** During the 1<sup>st</sup> sub-frame 1SF, the voltage level of the fifth divided power ELVSS1 is increased to make the light emitting device OLED to not emit light. For example, the fifth divided power ELVSS1 can be increased to have the same voltage level as the first divided power ELVDD1 during the 1<sup>st</sup> sub-frame 1SF. Thus, the fifth divided power ELVSS1 is increased during the 1<sup>st</sup> sub-frame 1SF, so that the pixels connected to the fifth divided power line ELVSS1 do not emit light.

**[0081]** During the 2<sup>nd</sup> sub-frame 2SF, the voltage level of the sixth divided power ELVSS2 is increased to make the light emitting device OLED to not emit light. For example, the sixth divided power ELVSS2 can be increased to have the same voltage level as the second divided power ELVDD2 during the 2<sup>nd</sup> sub-frame 2SF. Thus, the sixth divided power ELVSS2 is increased during the 2<sup>nd</sup> sub-frame 2SF, so that the pixels connected to the sixth divided power line ELVSS2 do not emit light.

**[0082]** During the 3<sup>rd</sup> sub-frame 3SF, the voltage level of the seventh divided power ELVSS3 is increased to make the light emitting device OLED to not emit light. For example, the seventh divided power ELVSS3 can be increased to have the same voltage level as the third divided power ELVDD3 during the 3<sup>rd</sup> sub-frame 3SF. Thus, the seventh divided power ELVSS3 is increased during the 3<sup>rd</sup> sub-frame 3SF, so that the pixels connected to the seventh divided power line ELVSS3 do not emit light.

**[0083]** During the 4<sup>th</sup> sub-frame 4SF, the voltage level of the eighth divided power ELVSS4 is increased to make the light emitting device OLED to not emit light. For example, the seventh divided power ELVSS4 can be increased to have the same voltage level as the fourth divided power ELVDD4 during the 4<sup>th</sup> sub-frame 4SF. Thus, the eighth divided power ELVSS4 is increased during the 4<sup>th</sup> sub-frame 4SF, so that the pixels connected to the eighth divided power line ELVSS4 do not emit light.

**[0084]** FIG 12 is a layout diagram of an organic light emitting diode display according to a fifth embodiment of the present invention.

**[0085]** Referring to FIG. 12, the organic light emitting diode display according to the fifth embodiment of the present invention additionally includes first through fourth transistors M21 through M24 respectively connected to

the fifth through eighth divided power lines ELVSS1 through ELVSS4 in order to maintain some pixels in the non-emission state during a predetermined sub-frame.

**[0086]** The first transistor M21 is connected to the fifth divided power line ELVSS1. Here, the first transistor M21 is turned off during the 1<sup>st</sup> sub-frame 1SF in response to an external first control signal CS1 (refer to FIG 12), and turned on during the rest frames 2SF through 4SF. Thus, the pixels connected to the fifth divided power line ELVSS1 do not emit light during the 1<sup>st</sup> sub-frame 1SF.

**[0087]** The second transistor M22 is connected to the sixth divided power line ELVSS2. Here, the second transistor M22 is turned off during the 2<sup>nd</sup> sub-frame 2SF in response to an external second control signal CS2 (refer to FIG 12), and turned on during the rest frames 1SF, 3SF and 4SF. Thus, the pixels connected to the sixth divided power line ELVSS2 do not emit light during the 2<sup>nd</sup> sub-frame 2SF.

**[0088]** The third transistor M23 is connected to the seventh divided power line ELVSS3. Here, the third transistor M23 is turned off during the 3<sup>rd</sup> sub-frame 3SF in response to an external third control signal CS3 (refer to FIG 12), and turned on during the rest frames 1SF, 2SF and 4SF. Thus, the pixels connected to the third divided power line ELVSS3 do not emit light during the 3<sup>rd</sup> sub-frame 3SF.

**[0089]** The fourth transistor M24 is connected to the eighth divided power line ELVSS4. Here, the fourth transistor M24 is turned off during the 4<sup>th</sup> sub-frame 4SF in response to an external fourth control signal CS4 (refer to FIG 12), and turned on during the rest frames 1SF through 3SF. Thus, the pixels connected to the eighth divided power line ELVSS4 do not emit light during the 4<sup>th</sup> sub-frame 4SF.

**[0090]** As described above, according to an embodiment of the present invention, various methods can be used for making some pixels to not emit light during a predetermined sub-frame. Here, the pixels in the non-emission state receive the data signals during a predetermined sub-frame, so that an image is displayed with uniform brightness. Meanwhile, the pixels according to an embodiment of the present invention can have various configurations. For example, the pixel 140 according to an embodiment of the present invention can be configured as shown in FIG. 13 to display an image corresponding to the data signal regardless of the threshold voltage of a transistor.

**[0091]** FIG. 13 is a circuit diagram of a pixel according to another embodiment of the present invention. For the sake of convenience, the pixel connected to the m<sup>th</sup> data line Dm and the n<sup>th</sup> scan line Sn will be exemplarily described. Hence, the pixel shown in FIG. 13 is connected with the fourth divided power ELVDD4.

**[0092]** Referring to FIG. 13, each pixel 140 according to an embodiment of the present invention includes a pixel circuit 142 connected with the light emitting device OLED, the data line Dm, the scan line Sn, and the emission control line En, and controlling the light emitting de-

vice OLED.

**[0093]** The light emitting device OLED includes the anode electrode connected to the pixel circuit 142 and the cathode electrode connected to the second power line ELVSS. Here, the light emitting device OLED emits light corresponding to current supplied from the pixel circuit 142.

**[0094]** The pixel circuit 142 includes first and sixth transistors M1 and M6 connected between the fourth divided power line ELVDD4 and the data line Dm; a third transistor M3 connected to the light emitting device OLED and the emission control line En; a second transistor M2 connected between the third transistor M3 and a first node N1; a fifth transistor M5 having first and gate electrodes connected to the first node N1 and a second electrode connected to a gate electrode of the second transistor M2; and a fourth transistor M4 connected between the gate and second electrodes of the second transistor M2. Here, the first electrode is used as one of the source and drain electrodes, and the second electrode is used as the other one.

**[0095]** The first transistor M1 has the first electrode connected to the data line Dm, and the second electrode connected to the first node N1. Further, the first transistor M1 has the gate electrode connected to the scan line Sn. Here, the first transistor M1 is turned on in response to the scan signal supplied through the scan line Sn, and supplies the data signal from the data line Dm to the first node N1.

**[0096]** The second transistor M2 has the first electrode connected to the first node N1, and the gate electrode connected to a capacitor Cst. Further, the second transistor M2 has the second electrode connected to the first electrode of the third transistor M3. Here, the second transistor M2 supplies current corresponding to voltage charged in the capacitor Cst to the light emitting device OLED.

**[0097]** The third transistor M3 has the first electrode connected to the second electrode of the second transistor M2, and the gate electrode connected to the emission control line En. Further, the third transistor M3 has the second electrode connected to the light emitting device OLED. Here, the third transistor M3 is turned on while the emission control signal is not supplied through the emission control line En, and supplies the current from the second transistor M2 to the light emitting device OLED.

**[0098]** The fourth transistor M4 has the second electrode connected to the gate electrode of the second transistor M2, and the first electrode connected to the second electrode of the second transistor M2. Further, the fourth transistor M4 has the gate electrode connected to the scan line Sn. Here, the fourth transistor M4 is turned on in response to the scan signal supplied through the scan line Sn, and controls the fourth transistor M4 to be connected like a diode.

**[0099]** The fifth transistor M5 has the gate and first electrodes connected to the first node N1, and the second

electrode connected to the gate electrode of the second transistor M2. Here, the fifth transistor M5 is connected like a diode, and supplies an initialization voltage from the data line Dm to the gate electrode of the second transistor M2.

**[0100]** The sixth transistor M6 has the second electrode connected to the first node N1, and the first electrode connected to the fourth divided power line ELVDD4. Further, the sixth transistor M6 has the gate electrode connected to the emission control line En. Here, the sixth transistor M6 is turned on while the emission control signal is not supplied, and electrically connects the first power line ELVDD with the first node N1.

**[0101]** Herein below, operations of the pixel 142 will be described with reference to FIG. 14. First, the scan signal is supplied to the scan line Sn, and the initialization voltage Vi is supplied to the data lines D.

**[0102]** When the scan signal is supplied to the n<sup>th</sup> scan line Sn, the first transistor M1 and the fourth transistor M4 are turned on. As the first transistor M1 is turned on, the initialization voltage Vi is supplied from the data line Dm to the first node N1. Then, the fifth transistor M5 having the diode-like-connection is turned on by the initialization voltage Vi supplied to the first node N1, and thus the initialization voltage Vi is supplied to the gate terminal of the second transistor M2.

**[0103]** When the initialization voltage Vi is supplied to the gate electrode of the second transistor M2, the gate electrode of the second transistor M2 and the capacitor Cst are initialized. In other words, the gate electrode of the second transistor M2 is initialized by the initialization voltage Vi having a voltage level lower than the lowest voltage level of the data signal supplied from the data driver 120. Then, the second transistor M2 is turned on regardless of the voltage level of the data signal supplied to the first node N1.

**[0104]** After supplying the initialization voltage Vi to the gate electrode of the second transistor M2, a data signal DS corresponding to a predetermined gray level is supplied to the data line Dm. Then, the data signal Ds is supplied from the data line Dm to the first node N1 via the first transistor M1. At this time, the gate electrode of the second transistor M2 is initialized by the initialization voltage Vi, so that the second transistor M2 is turned on. As the second transistor M2 is turned on, the data signal Ds applied to the first node N1 is supplied to a first terminal of the capacitor Cst via the second and fourth transistors M2 and M4. At this time, the data signal, of which the voltage is lowered by the voltage corresponding to the threshold voltage Vth of the second transistor M2, is supplied to the first terminal of the capacitor Cst, and thus the capacitor Cst is charged with the voltage corresponding to the data signal and the threshold voltage Vth of the second transistor M2.

**[0105]** In the pixel according to another embodiment of the present invention, the capacitor Cst is charged with the data signal and the voltage corresponding to the threshold voltage Vth, so that an image is displayed with

desired brightness. Then, the current corresponding to the voltage charged in the capacitor Cst is supplied to the light emitting device OLED during the rest frames except for the sub-frame supplying the data signal, thereby displaying an image.

**[0106]** As described above, the present invention provides an organic light emitting diode display and a driving method thereof, in which one frame is divided into a plurality of sub-frames, and pixels receiving data signals during a sub-frame are maintained in a non-emission state, so that pixels are respectively charged with desired voltages. Thus, an image is displayed with uniform brightness corresponding to the data signal.

## Claims

1. An active matrix organic light emitting diode display adapted to divide one frame into a plurality of sub-frames (1SF...iSF), the organic light emitting diode display comprising:

a plurality of scan lines (S1...Sn), the scan lines (S1...Sn) being divided into as many groups as there are sub-frames (1SF...iSF) in one frame, each group of scan lines (S1...Sn) comprising a plurality of scan lines (S1...Sn) and being associated with one of the sub-frames (1SF...iSF);  
 a plurality of data lines (D1...Dm);  
 a plurality of emission control lines (E1...En);  
 a plurality of pixels (140), each of the pixels (140) connected to one of said scan lines (S1...Sn), one of said emission control lines (E1...En) and one of said data lines (D1...Dm);  
 a scan driver (110) adapted to supply scan signals in sequence to the scan lines (S1...Sn) of each group of scan lines (S1...Sn) during the sub-frame (1SF...iSF) associated with the group of scan lines (S1...Sn), the scan driver (110) being further adapted to provide emission control signals to the emission control lines (E1...En);  
 a data driver (120) adapted to supply data signals corresponding to said scan signals; and  
 a plurality of first power sources (ELVDD1...ELVDD4), the number of first power sources (ELVDD1...ELVDD4) being equal to the number of groups of scan lines (S1...Sn), each of which being connected to anode electrodes of light emitting devices (OLED) provided in said pixels (140) of a respective group of scan lines (S1...Sn), wherein the organic light emitting diode display is adapted to set all pixels (140) connected to scan lines (S1...Sn) of a group of scan lines (S1...Sn) to which scan signals are being supplied by the scan driver (110) into a non-light-emitting state.

2. The active matrix organic light emitting diode display

according to claim 1, wherein said scan driver (110) supplies the scan signals to 1/i scan lines (S1...Sn) among the scan lines(S1...Sn) provided in the pixel portion (130) per sub-frame (1SF...iSF), where *i* is the number of sub-frames (1SF...iSF) corresponding to one frame.

3. The active matrix organic light emitting diode display according to claim 2, wherein said data driver (120) supplies the data signal to the pixels (140) connected to the pixels (140) receiving the scan signals during each sub-frame (1SF...iSF).

4. The active matrix organic light emitting diode display according to claim 3, wherein the pixel portion (130) comprises *i* first power sources (ELVDD1...ELVDD4), and the pixels (140) receiving the data signal during the same sub-frame (1SF...iSF) are connected to the same first power source (ELVDD1...ELVDD4) among *i* first power sources (ELVDD1...ELVDD4).

5. The active matrix organic light emitting diode display according to claim 4, wherein said first power source (ELVDD1...ELVDD4) among *i* first power sources (ELVDD1...ELVDD4), connected with the pixels (140) receiving the data signal, has a voltage level enough to make the pixels (140) do not emit light during the sub-frame (1SF... iSF) for receiving the data signal.

6. The active matrix organic light emitting diode display according to claim 4, further comprising *i* transistors connected to *i* first power sources (ELVDD1...ELVDD4), respectively.

7. The active matrix organic light emitting diode display according to claim 6, wherein the transistors among *i* transistors, connected to the pixels (140) receiving the data signal, are turned off during the sub-frame (1SF...iSF) for receiving the data signal, and the rest of the transistors are turned on during the same sub-frame (1SF...iSF).

8. The active matrix organic light emitting diode display according to claim 3, further comprising *i* second power sources (ELVSS1...ELVSS4) connected to cathode electrodes of said light emitting devices (OLED) provided in said pixels (140).

9. The active matrix organic light emitting diode display according to claim 8, wherein said pixels (140) receiving the data signal during the same sub-frame (1 SF...iSF) are connected to the same second power source (ELVSS1...ELVSS4) among *i* second power sources (ELVSS1...ELVSS4).

10. The active matrix organic light emitting diode display

- according to claim 9, wherein said second power source (ELVSS1...ELVSS4) among *i* second power sources (ELVSS1...ELVSS4), connected with the pixels (140) receiving the data signal, has a voltage level enough to make the pixels (140) do not emit light during the sub-frame (1SF...iSF) for receiving the data signal.
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11. The active matrix organic light emitting diode display according to claim 9, further comprising *i* transistors connected to *i* second power sources (ELVSS1...ELVSS4), respectively.
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12. The active matrix organic light emitting diode display according to claim 11, wherein one transistor among *i* transistors, connected to said pixels (140) receiving the data signal, is turned on during the sub-frame (1SF...iSF) for receiving the data signal, and the rest of the transistors are turned off during the same sub-frame (1SF...iSF).
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13. The active matrix organic light emitting diode display according to claim 4, wherein each one of the plurality of pixels (140) comprises:
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- a first transistor (M1) connected to said scan line (S1...Sn) and said data line (D1...Dm), and controlled by the scan signal;
- a second transistor (M2) to control current to be supplied to said light emitting device (OLED);
- 30
- a capacitor (Cst) connected to said second transistor (M2) and to be charged with voltage corresponding to the data signal, wherein the second transistor (M2) is adapted to control the current to be supplied to said light emitting device (OLED) in correspondence to the voltage charged in the capacitor (Cst); and
- 35
- a third transistor (M3) connected to an emission control line (E1...En), turned off for a period while an emission control signal is supplied from said scan driver (110), and turned on for the rest of periods.
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14. The active matrix organic light emitting diode display according to claim 13, wherein the emission control line (E1...En) is formed in parallel with said scan line (S1...Sn), and provided as the same number as *i* sub-frames.
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15. The active matrix organic light emitting diode display according to claim 14, wherein the pixels (140) receiving the data signal during the same sub-frame (1SF...iSF) are connected to the same emission control line (E1...En).
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16. The active matrix organic light emitting diode display according to claim 15, wherein said scan driver (110) supplies an emission control signal to one emission
- control line (E1...En) among *i* emission control lines (E1...En) per sub-frame the pixels (140) to control the pixels (140) receiving the data signals to not emit light.
17. A method of driving an active matrix organic light emitting diode display according to one of the preceding claims, comprising:
- dividing one frame into a plurality of sub-frames (1SF...iSF);
- providing as many first power sources (ELVDD1...ELVDD4) as there are sub-frames (1SF...iSF) in one frame;
- dividing a plurality of scan lines (S1...Sn) of the active matrix organic light emitting diode display into as many groups of scan lines (S1...Sn) as there are sub-frames (1SF...iSF) in one frame, each group of scan lines (S1...Sn) comprising a plurality of scan lines (S1...Sn) and being associated with one of the sub-frames (1SF...iSF), the pixels connected to the scan lines (S1...Sn) of each group of scan lines (S1...Sn) being connected to a corresponding one of the plurality of first power sources (ELVDD1...ELVDD4);
- supplying scan signals in sequence to the scan lines (S1...Sn) of each group of scan lines (S1...Sn) during the sub-frame (1SF...iSF) associated with the group of scan lines (S1...Sn) while providing data signals to pixels (140) of the scan lines (S1...Sn) of the respective group of scan lines (S1...Sn); and
- setting all pixels (140) connected to scan lines (S1...Sn) of a group of scan lines (S1...Sn) to which scan signals are being supplied by the scan driver (110) into a non-light-emitting state by supplying emission control signals to the pixels (140).
18. The method according to claim 17, wherein the scan signals are supplied to 1/*i* scan lines (S1...Sn) among said scan lines (S1...Sn) provided in the pixel portion (130) per sub-frame (1SF...iSF), where, *i* is the number of sub-frames (1SF...iSF) corresponding to one frame.
19. The method according to claim 18, wherein data signals are supplied to the pixels (140) receiving the scan signals during each sub-frame (1SF...iSF).
20. The method according to claim 19, further comprising controlling the pixels (140) receiving the data signals to not emit light during the sub-frame (1SF...iSF) for receiving the data signal.
21. The method according to claim 20, wherein the controlling of the pixels (140) to not emit light comprises decreasing a voltage level of a power source
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(ELVDD1...ELVDD4) connected to an anode electrode of a light emitting device (OLED) provided in each pixel (140) receiving the data signal.

22. The method according to claim 20, wherein the controlling of the pixels (140) to not emit light comprises interrupting power supplied from a power source (ELVDD1...ELVDD4) connected to an anode electrode of a light emitting device (OLED) provided in each pixel (140) receiving the data signal.
23. The method according to claim 20, wherein the controlling of the pixels (140) to not emit light comprises turning off a transistor that is provided in each pixel (140) receiving the data signal and controls a point of time for supplying a current flowing in the light emitting device (OLED).
24. The method according to claim 20, wherein the controlling of the pixels (140) to not emit light comprises increasing a voltage level of a power source (ELVSS1...ELVSS4) connected to a cathode electrode of a light emitting device (OLED) provided in each pixel (140) receiving the data signal.
25. The method according to claim 20, wherein the controlling of the pixels (140) to not emit light comprises interrupting power supplied from a power source (ELVSS1...ELVSS4) connected to a cathode electrode of a light emitting device (OLED) provided in each pixel (140) receiving the data signal.

### Patentansprüche

1. Eine organische lichtemittierende Diodenanzeige mit Aktivmatrix, ausgebildet ein Frame in eine Mehrzahl von Subframes (1SF...iSF) aufteilen zu können, wobei die organische lichtemittierende Diodenanzeige Folgendes besitzt:

eine Mehrzahl von Abtastleitungen (S1...Sn), wobei die Abtastleitungen (S1...Sn) in so viele Gruppen aufgeteilt sind wie Teilbilder (1SF...iSF) in einem Frame vorhanden sind, wobei jede Gruppe von Abtastleitungen (S1...Sn) eine Mehrzahl von Abtastleitungen (S1...Sn) besitzt und einem der Teilbilder (1SF...iSF) zugeordnet ist;

eine Mehrzahl von Datenleitungen (D1...Dm);  
eine Mehrzahl von Emissionssteuerleitungen (E1...En);

eine Mehrzahl von Pixeln (140), wobei jedes der Pixel (140) mit einer der Abtastleitungen (S1...Sn), einer der Emissionssteuerleitungen (E1...En) und einer der Datenleitungen (D1...Dm) verbunden ist;

einen Abtasttreiber (110), der während des Teil-

bildes (1SF...iSF), das mit der Gruppe von Abtastleitungen (S1...Sn) verbunden ist, ausgebildet nacheinander Abtastsignale an die Abtastleitungen (S1...Sn) jeder Gruppe von Abtastleitungen (S1...Sn) liefern zu können, wobei der Abtasttreiber (110) ausgebildet ist außerdem Emissionssteuersignale an die Emissionssteuerleitungen (E1...En) liefern zu können; einen Datentreiber (120), ausgebildet Datensignale liefern zu können, die den Abtastsignalen entsprechen; und

eine Mehrzahl von ersten Stromquellen (ELVDD1...ELVDD4), wobei die Anzahl erster Stromquellen (ELVDD1...ELVDD4) gleich der Anzahl der Gruppen von Abtastleitungen (S1...Sn) ist, die jeweils mit Anodenelektroden von lichtemittierenden Vorrichtungen (OLED) verbunden sind, die in den Pixeln (140) einer jeweiligen Gruppe von Abtastleitungen (S1...Sn) vorhanden sind, wobei die organische lichtemittierende Diodenanzeige sämtliche Pixel (140), die mit Abtastleitungen (S1...Sn) einer Gruppe von Abtastleitungen (S1...Sn) verbunden sind, an die von dem Abtasttreiber (110) Abtastsignale geliefert werden, ausgebildet in einen nicht lichtemittierenden Zustand versetzen zu können.

2. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 1, wobei der Abtasttreiber (110) die Abtastsignale an die  $1/i$  Abtastleitungen (S1...Sn) liefert, und zwar unter den Abtastleitungen (S1...Sn), die sich in dem Pixelbereich (130) je Teilbild (1SF...iSF) befinden, wobei  $i$  die Anzahl von Subframes (1SF...iSF) ist, die einem Frame entsprechen.

3. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 2, wobei der Datentreiber (120) das Datensignal an die Pixel (140) liefert, die mit den Pixeln (140) verbunden sind, welche die Abtastsignale während eines jeden Teilbildes (1SF...iSF) empfangen.

4. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 3, wobei der Pixelabschnitt (130)  $i$  erste Stromquellen (ELVDD1...ELVDD4) umfasst, und die Pixel (140), welche das Datensignal während desselben Teilbildes (1SF...iSF) empfangen, mit derselben ersten Stromquelle (ELVDD1...ELVDD4) unter den  $i$  ersten Stromquellen (ELVDD1...ELVDD4) verbunden sind.

5. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 4, wobei die erste Stromquelle (ELVDD1...ELVDD4) unter den  $i$  ersten Stromquellen (ELVDD1...ELVDD4), die mit den Pi-

- xeln (140) verbunden ist, welche das Datensignal empfangen, einen Spannungspegel besitzt, der ausreicht, damit die Pixel (140) während des Teilbildes (1SF...iSF) für den Empfang des Datensignals kein Licht ausstrahlen.
6. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 4, die außerdem *i* Transistoren besitzt, die jeweils mit *i* ersten Stromquellen (ELVDD1.....ELVDD4) verbunden sind.
7. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 6, wobei die Transistoren unter *i* Transistoren, die mit den Pixeln (140), welche das Datensignal aufnehmen, verbunden sind, während des Teilbildes (1SF...iSF) zum Empfang des Datensignals abgeschaltet sind, und der Rest der Transistoren während desselben Teilbildes (1SF...iSF) eingeschaltet ist.
8. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 3, die außerdem *i* zweite Stromquellen (ELVSS1.....ELVSS4) besitzt, die mit Kathodenelektroden der lichtemittierenden Vorrichtung (OLED), die sich in den Pixeln (140) befindet, verbunden sind.
9. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 8, wobei die Pixel (140), die das Datensignal während des Teilbildes (1SF...iSF) empfangen, mit derselben zweiten Stromquelle (ELVSS1.....ELVSS4) unter den *i* zweiten Stromquellen (ELVSS1.....ELVSS4) verbunden sind.
10. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 9, wobei die zweite Stromquelle (ELVSS1.....ELVSS4) unter den *i* zweiten Stromquellen (ELVSS1.....ELVSS4), die mit den Pixeln (140), welche das Datensignal empfangen, verbunden ist, einen Spannungspegel besitzt, der ausreicht, damit die Pixel (140) während des Teilbildes (1SF...iSF) für den Empfang des Datensignals kein Licht ausstrahlen.
11. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 9, die außerdem *i* Transistoren besitzt, die jeweils mit *i* zweiten Stromquellen (ELVSS1.....ELVSS4) verbunden sind.
12. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 11, wobei ein Transistor unter *i* Transistoren, der mit den Pixeln (140), die das Datensignal empfangen, verbunden ist, während des Teilbildes (1SF...iSF) eingeschaltet ist, um das Datensignal zu empfangen, und der Rest der Transistoren während desselben Teilbildes (1SF...iSF) ausgeschaltet ist.
13. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 4, wobei jede der Mehrzahl von Pixeln (140) Folgendes besitzt:
- 5 einen ersten Transistor (M1), der mit der Abtastleitung (S1...Sn) und der Datenleitung (D1...Dm) verbunden ist, und der von dem Abtastsignal gesteuert wird;
- 10 einen zweiten Transistor (M2) zur Steuerung des Stroms, der an die lichtemittierende Vorrichtung (OLED) geliefert wird;
- 15 einen Kondensator (Cst), der mit dem zweiten Transistor (M2) verbunden ist, und mit Spannung zu laden ist, die dem Datensignal entspricht, wobei der zweite Transistor (M2) den Strom, der an die lichtemittierende Vorrichtung (OLED) zu liefern ist, in Übereinstimmung mit der Spannung steuern kann, mit der der Kondensator (Cst) geladen ist; und
- 20 einen dritten Transistor (M3), der mit einer Emissionssteuerleitung (E1...En) verbunden ist, der für einen Zeitraum ausgeschaltet ist, während dem ein Emissionssteuersignal von dem Abtasttreiber (110) entsendet wird, und der für die restliche Zeit eingeschaltet ist.
14. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 13, wobei die Emissionssteuerleitung (E1...En) parallel zu der Abtastleitung (S1...Sn) gebildet ist, und in der gleichen Anzahl wie die *i* Teilbilder bereitgestellt ist.
15. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 14, wobei die Pixel (140), die das Datensignal während desselben Teilbildes (1SF...iSF) empfangen, mit derselben Emissionssteuerleitung (E1...En) verbunden sind.
16. Die organische lichtemittierende Diodenanzeige mit Aktivmatrix nach Anspruch 15, wobei der Abtasttreiber (110) an eine Emissionssteuerleitung (E1...En) unter *i* Emissionssteuerleitungen (E1...En) je Teilbild ein Emissionssteuersignal liefert, um die Pixel (140), die die Datensignale empfangen, zu steuern, damit sie kein Licht aussenden.
17. Verfahren zur Ansteuerung einer organischen lichtemittierenden Diodenanzeige mit Aktivmatrix nach einem der vorhergehenden Ansprüche, das Folgendes umfasst:
- Teilen eines Frame in eine Mehrzahl von Subframes (1SF...iSF);  
Bereitstellen so vieler erster Stromquellen (ELVDD1.....ELVDD4) wie Teilbilder (1SF...iSF) in einem Frame vorhanden sind;  
Teilen einer Mehrzahl von Abtastleitungen (S1...Sn) der organischen lichtemittierenden

- Diodenanzeige mit Aktivmatrix in so viele Gruppen von Abtastleitungen (S1...Sn) wie Teilbilder (1SF...iSF) in einem Frame vorhanden sind, wobei jede Gruppe von Abtastleitungen (S1...Sn) eine Mehrzahl von Abtastleitungen (S1...Sn) aufweist und mit einem der Teilbilder (1SF...iSF) verbunden ist, wobei die mit den Abtastleitungen (S1...Sn) jeder Gruppe von Abtastleitungen (S1...Sn) verbundenen Pixel mit einer entsprechenden der Mehrzahl der ersten Stromquellen (ELVDD1.....ELVDD4) verbunden sind;
- Aussenden von Abtastsignalen nacheinander an die Abtastleitungen (S1...Sn) jeder Gruppe der Abtastleitungen (S1...Sn) während des Teilbildes (1SF...iSF), das mit der Gruppe von Abtastleitungen (S1...Sn) verbunden ist, während Datensignale an die Pixel (140) der Abtastleitungen (S1...Sn) der jeweiligen Gruppe von Abtastleitungen (S1...Sn) entsendet werden; und Versetzen sämtlicher Pixel (140), die mit Abtastleitungen (S1...Sn) einer Gruppe von Abtastleitungen (S1...Sn) verbunden sind, an die von dem Abtasttreiber (110) Abtastsignale entsendet werden, in einen nicht lichtemittierenden Zustand, indem Emissionssteuersignale an die Pixel (140) entsendet werden.
18. Verfahren nach Anspruch 17, wobei die Abtastsignale an  $1/i$  Abtastleitungen (S1...Sn) unter den Abtastleitungen (S1...Sn) entsendet werden, die in dem Pixelabschnitt (130) je Teilbild (1SF...iSF) vorhanden sind, wobei  $i$  die Anzahl von Subframes (1SF...iSF) ist, die einem Frame entspricht.
19. Verfahren nach Anspruch 18, wobei die Datensignale an die Pixel (140) gesendet werden, die die Abtastsignale während eines jeden Teilbildes (1SF...iSF) empfangen.
20. Verfahren nach Anspruch 19, das außerdem die Steuerung der die Datensignale empfangenden Pixel (140) umfasst, um während des Teilbildes (1SF...iSF) zum Empfang des Datensignals keine Licht auszustrahlen.
21. Verfahren nach Anspruch 20, wobei die Steuerung der Pixel (140) zum Nichtaussenden von Licht die Senkung eines Spannungspegels einer Stromquelle (ELVDD1.....ELVDD4) umfasst, die an eine Anodenelektrode einer lichtemittierende Vorrichtung (OLED) angeschlossen ist, welche in jedem das Datensignal empfangenden Pixel (140) vorhanden ist.
22. Verfahren nach Anspruch 20, wobei die Steuerung der Pixel (140) zum Nichtaussenden von Licht die Unterbrechung des von einer Stromquelle (ELVDD1.....ELVDD4) gelieferten Stroms umfasst,
- die an eine Anodenelektrode einer lichtemittierende Vorrichtung (OLED) angeschlossen ist, welche in jedem das Datensignal empfangenden Pixel (140) vorhanden ist.
23. Verfahren nach Anspruch 20, wobei die Steuerung der Pixel (140) zum Nichtaussenden von Licht das Abschalten eines Transistors umfasst, der in jedem das Datensignal empfangenden Pixel (140) vorhanden ist, und einen Zeitpunkt steuert, um einen Strom zu liefern, der in der lichtemittierende Vorrichtung (OLED) fließt.
24. Verfahren nach Anspruch 20, wobei die Steuerung der Pixel (140) zum Nichtaussenden von Licht die Erhöhung eines Spannungspegels einer Stromquelle (ELVDD1.....ELVDD4) umfasst, die an eine Kathodenelektrode einer lichtemittierende Vorrichtung (OLED) angeschlossen ist, welche in jedem das Datensignal empfangenden Pixel (140) vorhanden ist.
25. Verfahren nach Anspruch 20, wobei die Steuerung der Pixel (140) zum Nichtaussenden von Licht die Unterbrechung des von einer Stromquelle (ELVSS1.....ELVSS4) gelieferten Stroms umfasst, die an eine Kathodenelektrode einer lichtemittierende Vorrichtung (OLED) angeschlossen ist, welche in jedem das Datensignal empfangenden Pixel (140) vorhanden ist.

## Revendications

1. Afficheur à diodes électroluminescentes organiques à matrice active conçu pour diviser une trame en une pluralité de sous-trames (1SF... iSF), l'afficheur à diodes électroluminescentes organiques comprenant :
- une pluralité de lignes de balayage (S1...Sn), les lignes de balayage (S1...Sn) étant divisées en autant de groupes qu'il y a de sous-trames (1SF...iSF) dans une trame, chaque groupe de lignes de balayage (S1...Sn) comprenant une pluralité de lignes de balayage (S1...Sn) et étant associé à l'une des sous-trames (1SF...iSF) ;
- une pluralité de lignes de données (D1...Dm) ;
- une pluralité de lignes de commande d'émission (E1...En) ;
- une pluralité de pixels (140), chacun des pixels (140) étant connecté à l'une desdites lignes de balayage (S1...Sn), à l'une desdites lignes de commande d'émission (E1...En) et à l'une desdites lignes de données (D1...Dm) ;
- un circuit d'attaque de balayage (110) apte à délivrer séquentiellement des signaux de balayage aux lignes de balayage (S1...Sn) de chaque groupe de lignes de balayage (S1...Sn) pen-

- dant la sous-trame (1SF...iSF) associée au groupe de lignes de balayage (S1...Sn), le circuit d'attaque de balayage (110) étant en outre apte à fournir des signaux de commande d'émission aux lignes de commande d'émission (E1...En) ; un circuit d'attaque de données (120) apte à délivrer des signaux de données correspondant auxdits signaux de balayage ; et une pluralité de premières sources d'alimentation (ELVDD1...ELVDD4), le nombre de premières sources d'alimentation (ELVDD1...ELVDD4) étant égal au nombre de groupes de lignes de balayage (S1...Sn) dont chacune est connectée à des électrodes formant anodes de dispositifs électroluminescents (OLED) disposés dans lesdits pixels (140) d'un groupe respectif de lignes de balayage (S1...Sn), dans lequel l'afficheur à diodes électroluminescentes organiques est conçu pour faire passer tous les pixels (140) connectés à des lignes de balayage (S1...Sn) d'un groupe de lignes de balayage (S1...Sn) auxquels des signaux de balayage sont en cours de fourniture par le circuit d'attaque de balayage (110) à un état de non-émission lumineuse.
2. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 1, dans lequel le circuit d'attaque de balayage (110) délivre les signaux de balayage à  $1/i$  lignes de balayage (S1...Sn) parmi les lignes de balayage (S1...Sn) disposées dans la partie à pixels (130) pour chaque sous-trame (1SF...iSF), où  $i$  est le nombre de sous-trames (1SF...iSF) correspondant à une trame.
  3. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 2, dans lequel ledit circuit d'attaque de données (120) délivre le signal de données aux pixels (140) connectés aux pixels (140) recevant les signaux de balayage pendant chaque sous-trame (1SF...iSF).
  4. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 3, dans lequel la partie à pixels (130) comprend  $i$  premières sources d'alimentation (ELVDD1...ELVDD4), et les pixels (140) recevant le signal de données pendant la même sous-trame (1SF...iSF) sont connectés à la même première source d'alimentation (ELVDD1...ELVDD4) parmi les  $i$  premières sources d'alimentation (ELVDD1...ELVDD4).
  5. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 4, dans lequel ladite première source d'alimentation (ELVDD1...ELVDD4) parmi les  $i$  premières sources d'alimentation (ELVDD1...ELVDD4) connectées aux pixels (140) recevant le signal de données, a un niveau de tension suffisant pour faire en sorte que les pixels (140) n'émettent pas de lumière pendant la sous-trame (1SF...iSF) pour recevoir le signal de données.
  6. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 4, comprenant en outre  $i$  transistors respectivement connectés à  $i$  premières sources d'alimentation (ELVDD1...ELVDD4).
  7. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 6, dans lequel les transistors, parmi les  $i$  transistors connectés aux pixels (140) recevant le signal de données, sont rendus non passants pendant la sous-trame (1SF...iSF) pour recevoir le signal de données, et les transistors restants sont rendus passants pendant la même sous-trame (1SF...iSF).
  8. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 3, comprenant en outre  $i$  deuxièmes sources d'alimentation (ELVSS1...ELVSS4) connectées à des électrodes formant cathodes desdits dispositifs électroluminescents (OLED) disposés dans lesdits pixels (140).
  9. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 8, dans lequel lesdits pixels (140) recevant le signal de données pendant la même sous-trame (1SF...iSF) sont connectés à la même deuxième source d'alimentation (ELVSS1...ELVSS4) parmi les  $i$  deuxièmes sources d'alimentation (ELVSS1...ELVSS4).
  10. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 9, dans lequel ladite deuxième source d'alimentation (ELVSS1...ELVSS4) parmi les  $i$  deuxièmes sources d'alimentation (ELVSS1...ELVSS4) connectées aux pixels (140) recevant le signal de données, a un niveau de tension suffisant pour faire en sorte que les pixels (140) n'émettent pas de lumière pendant la sous-trame (1SF...iSF) pour recevoir le signal de données.
  11. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 9, comprenant en outre  $i$  transistors respectivement connectés à  $i$  deuxièmes sources d'alimentation (ELVSS1...ELVSS4).
  12. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 11, dans lequel un transistor parmi  $i$  transistors connectés auxdits pixels (140) recevant le signal de données, est rendu passant pendant la sous-trame (1SF...iSF) pour recevoir le signal de données, et les transistors restants sont rendus non passants pendant la même sous-trame (1SF...iSF).

13. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 4, dans lequel chacun de la pluralité de pixels (140) comprend :

un premier transistor (M1) connecté à ladite ligne de balayage (S1...Sn) et à ladite ligne de données (D1...Dm), et commandé par le signal de balayage ;  
 un deuxième transistor (M2) pour commander le courant devant être délivré audit dispositif électroluminescent (OLED) ;  
 un condensateur (Cst) connecté audit deuxième transistor (M2) et devant être chargé par une tension correspondant au signal de données, dans lequel le deuxième transistor (M2) est apte à commander le courant devant être délivré audit dispositif électroluminescent (OLED) en correspondance avec la tension chargée dans le condensateur (Cst) ; et  
 un troisième transistor (M3) connecté à une ligne de commande d'émission (E1...En), rendu non passant pendant une période pendant laquelle un signal de commande d'émission est délivré par ledit circuit d'attaque de balayage (110), et rendu passant pendant les périodes restantes.

14. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 13, dans lequel la ligne de commande d'émission (E1...En) est formée en parallèle avec ladite ligne de balayage (S1...Sn) et est fournie en un nombre égal à celui des *i* sous-trames.

15. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 14, dans lequel les pixels (140) recevant le signal de données pendant la même sous-trame (1SF...iSF) sont connectés à la même ligne de commande d'émission (E1...En).

16. Afficheur à diodes électroluminescentes organiques à matrice active selon la revendication 15, dans lequel ledit circuit d'attaque de balayage (110) délivre un signal de commande d'émission à une ligne de commande d'émission (E1...En) parmi *i* lignes de commande d'émission (E1...En) pour chaque sous-trame des pixels (140) pour commander les pixels (140) recevant les signaux de données afin qu'ils n'émettent pas de lumière.

17. Procédé d'attaque d'un afficheur à diodes électroluminescentes précédentes, consistant à :

diviser une trame en une pluralité de sous-trames (1SF...iSF) ;  
 fournir autant de premières sources d'alimentation (ELVDD1...ELVDD4) qu'il y a de sous-trames

(1SF...iSF) dans une trame ;  
 diviser une pluralité de lignes de balayage (S1...Sn) d'un afficheur à diodes électroluminescentes organiques à matrice active en autant de groupes de lignes de balayage (S1...Sn) qu'il y a de sous-trames (1SF...iSF) dans une trame, chaque groupe de lignes de balayage (S1...Sn) comprenant une pluralité de lignes de balayage (S1...Sn) et étant associé à l'une des sous-trames (1SF...iSF), les pixels connectés aux lignes de balayage (S1...Sn) de chaque groupe de lignes de balayage (S1...Sn) étant connectés à l'une, correspondante, de la pluralité de premières sources d'alimentation (ELVDD1...ELVDD4) ;  
 délivrer séquentiellement des signaux de balayage aux lignes de balayage (S1...Sn) de chaque groupe de lignes de balayage (S1...Sn) pendant la sous-trame (1SF...iSF) associée au groupe de lignes de balayage (S1...Sn) tout en fournissant des signaux de données aux pixels (140) des lignes de balayage (S1...Sn) du groupe respectif de lignes de balayage (S1...Sn) ; et faire passer tous les pixels (140) connectés à des lignes de balayage (S1...Sn) d'un groupe de lignes de balayage (S1...Sn) auxquels des signaux de balayage sont en cours de fourniture par le circuit d'attaque de balayage (110) dans un état de non-émission lumineuse en fournissant des signaux de commande d'émission aux pixels (140).

18. Procédé selon la revendication 17, dans lequel les signaux de balayage sont délivrés à  $1/i$  lignes de balayage (S1...Sn) parmi lesdites lignes de balayage (S1...Sn) disposées dans la partie à pixels (130) pour chaque sous-trame (1SF...iSF), où *i* est le nombre de sous-trames (1SF...iSF) correspondant à une trame.

19. Procédé selon la revendication 18, dans lequel des signaux de données sont délivrés aux pixels (140) recevant les signaux de balayage pendant chaque sous-trame (1SF...iSF).

20. Procédé selon la revendication 19, consistant en outre à commander les pixels (140) recevant les signaux de données afin qu'ils n'émettent pas de lumière pendant la sous-trame (1SF...iSF) pour recevoir le signal de données.

21. Procédé selon la revendication 20, dans lequel la commande des pixels (140) afin qu'ils n'émettent pas de lumière consiste à réduire un niveau de tension d'une source d'alimentation (ELVDD1...ELVDD4) connectée à une électrode formant anode d'un dispositif électroluminescent (OLED) disposé dans chaque pixel (140) recevant le signal de don-

nées.

- 22.** Procédé selon la revendication 20, dans lequel la commande des pixels (140) afin qu'ils n'émettent pas de lumière consiste à interrompre l'alimentation délivrée par une source d'alimentation (ELVDD1... ELVDD4) connectée à une électrode formant anode d'un dispositif électroluminescent (OLED) disposé dans chaque pixel (140) recevant le signal de données. 5 10
- 23.** Procédé selon la revendication 20, dans lequel la commande des pixels (140) afin qu'ils n'émettent pas de lumière consiste à rendre non passant un transistor qui est disposé dans chaque pixel (140) recevant le signal de données et commande un point dans le temps où un courant passant dans le dispositif électroluminescent (OLED) doit être délivré. 15
- 24.** Procédé selon la revendication 20, dans lequel la commande des pixels (140) afin qu'ils n'émettent pas de lumière consiste à augmenter un niveau de tension d'une source d'alimentation (ELVSS1... ELVSS4) connectée à une électrode formant cathode d'un dispositif électro-luminescent (OLED) disposé dans chaque pixel (140) recevant le signal de données. 20 25
- 25.** Procédé selon la revendication 20, dans lequel la commande des pixels (140) afin qu'ils n'émettent pas de lumière consiste à interrompre l'alimentation délivrée par une source d'alimentation (ELVSS1... ELVSS4) connectée à une électrode formant cathode d'un dispositif électro-luminescent (OLED) disposé dans chaque pixel (140) recevant le signal de données. 30 35

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FIG. 1  
PRIOR ART

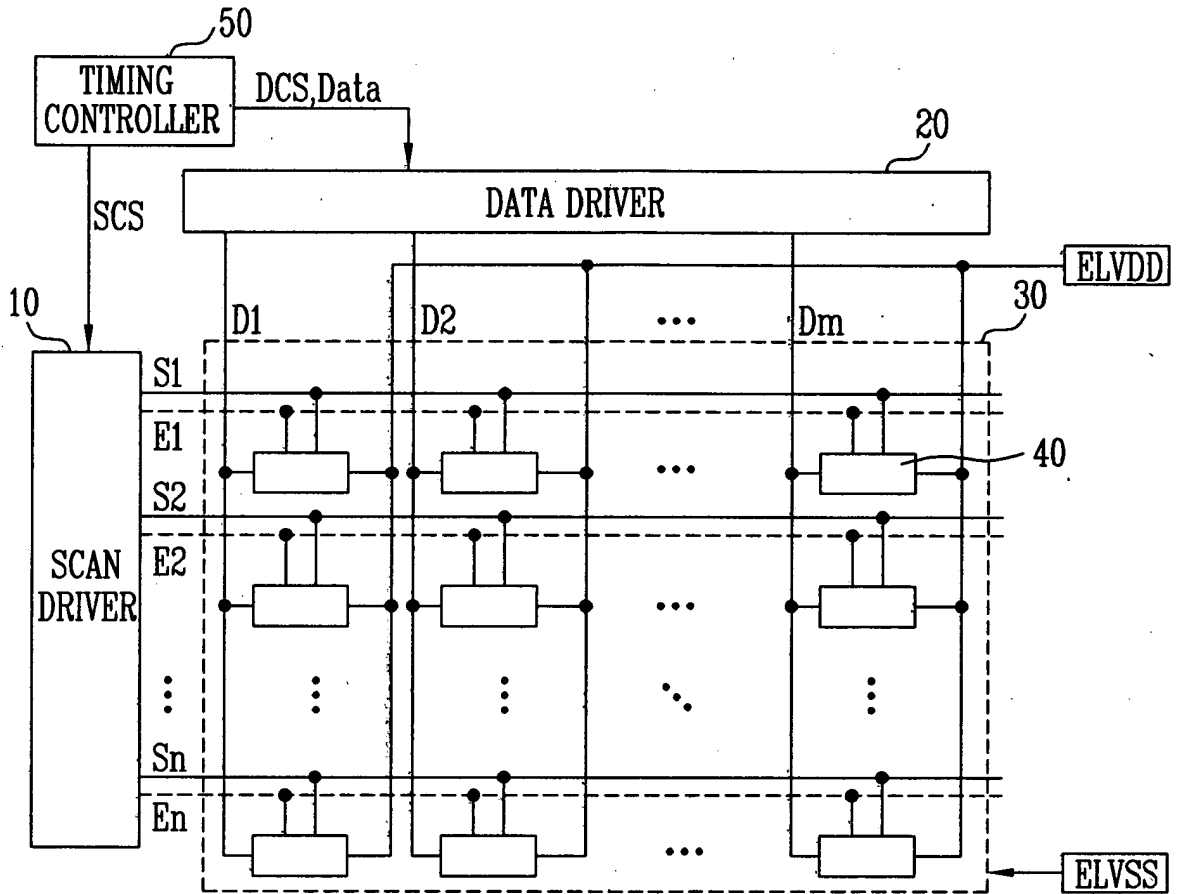


FIG. 2

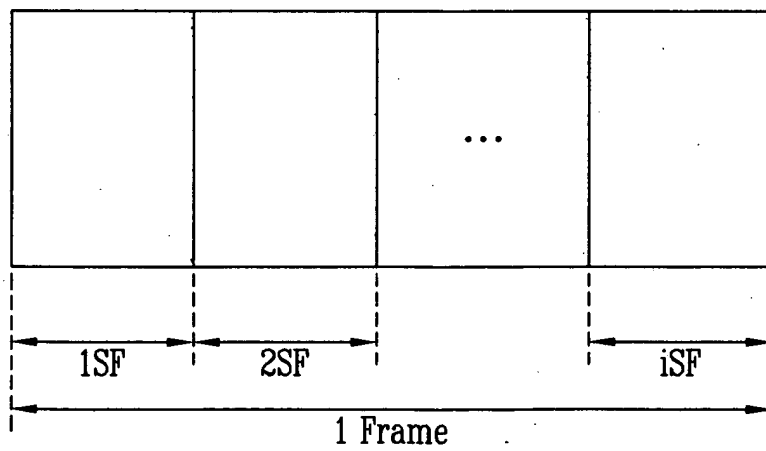


FIG. 3

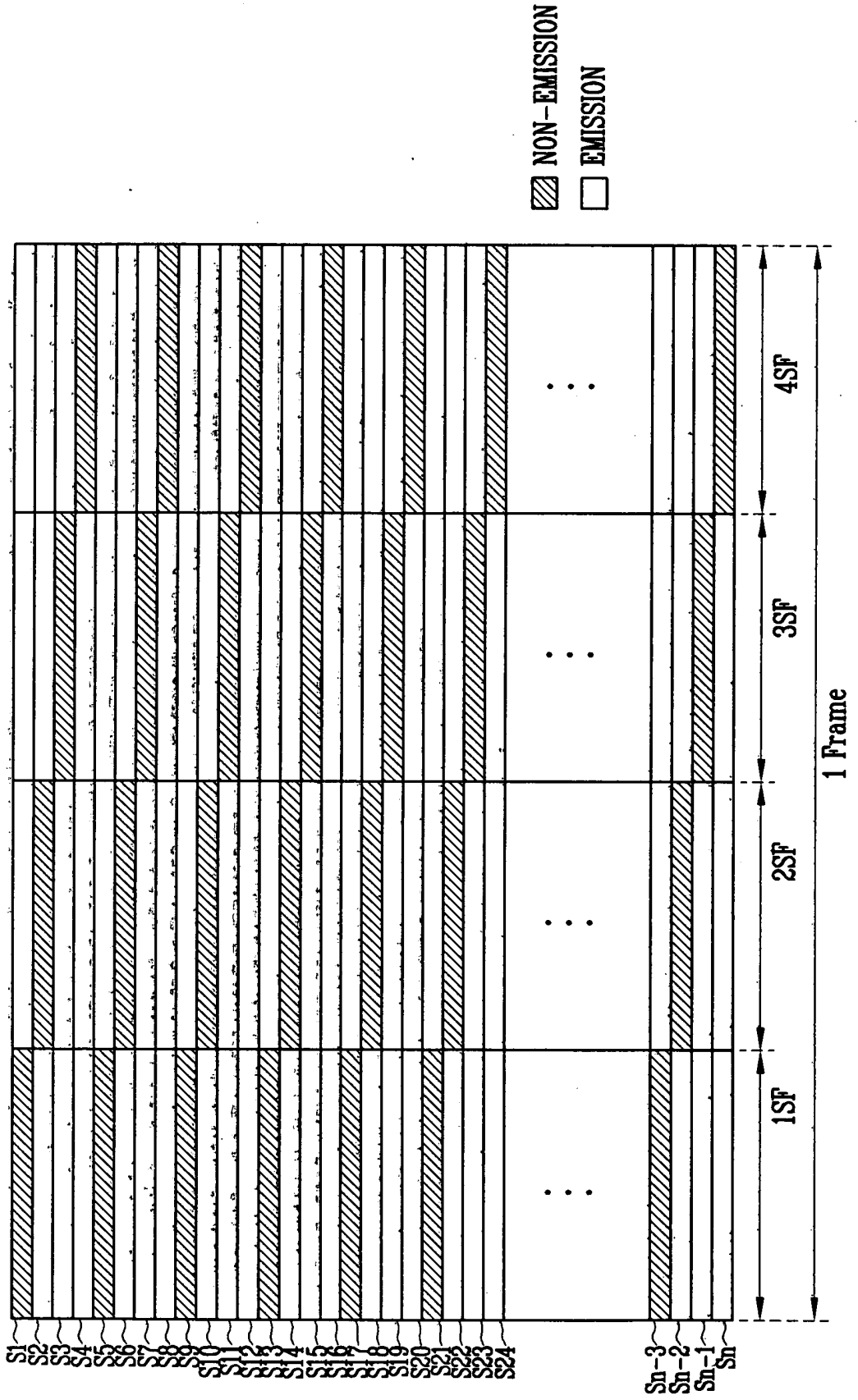


FIG. 4

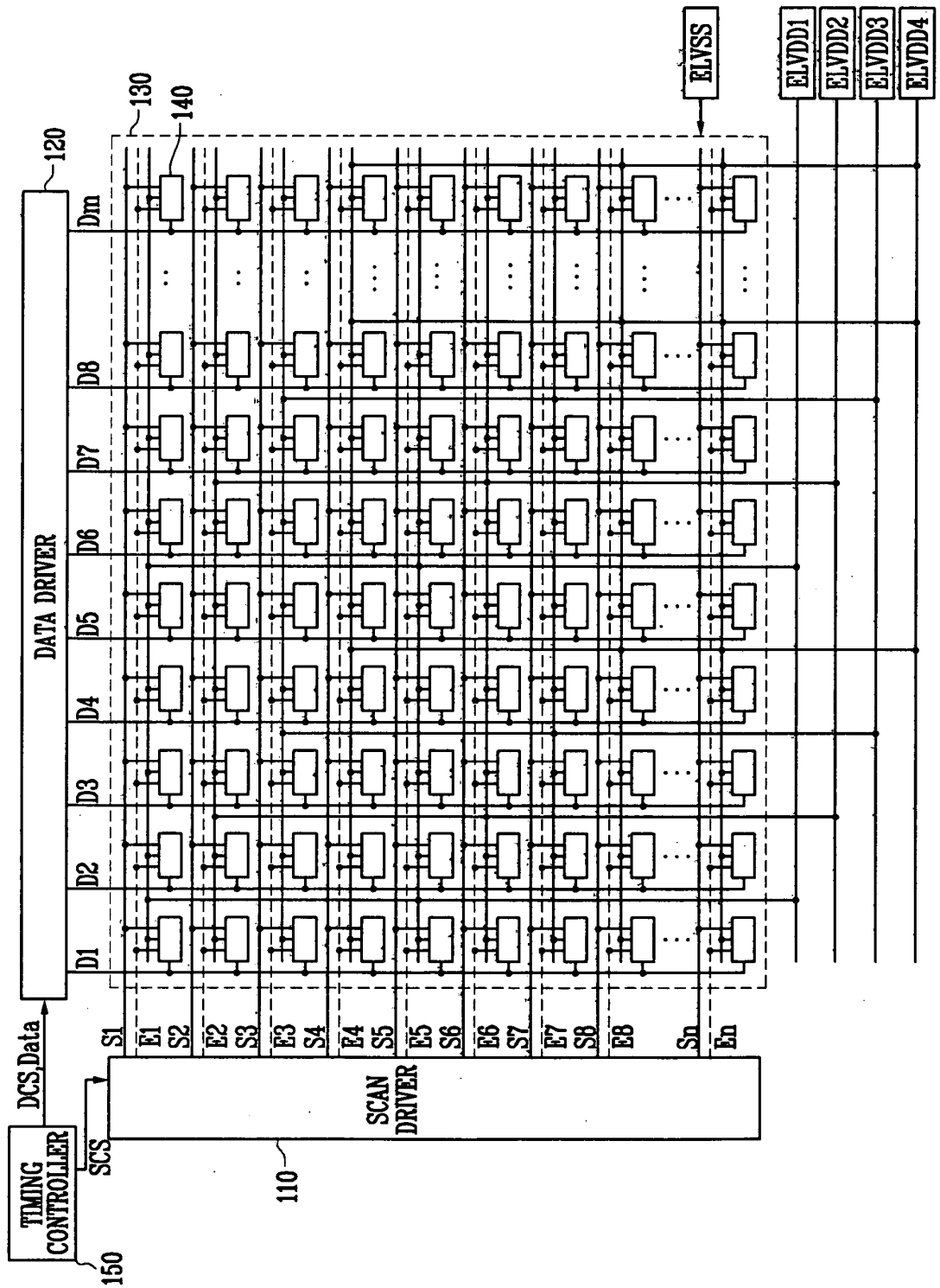




FIG. 6

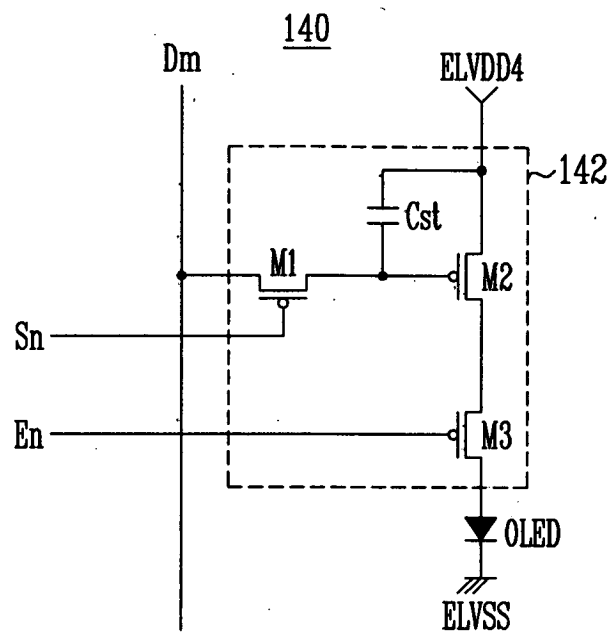


FIG. 7

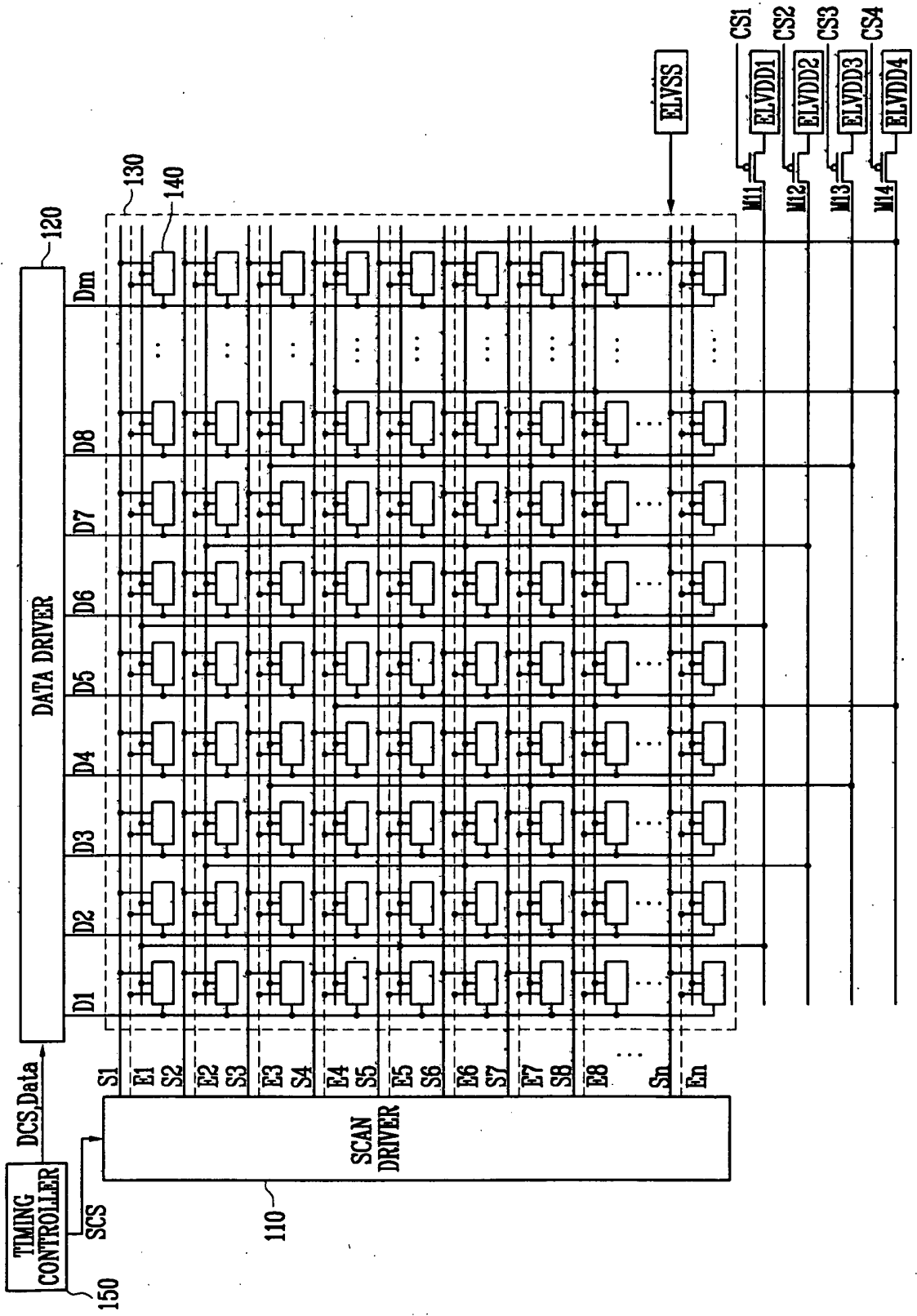


FIG. 8

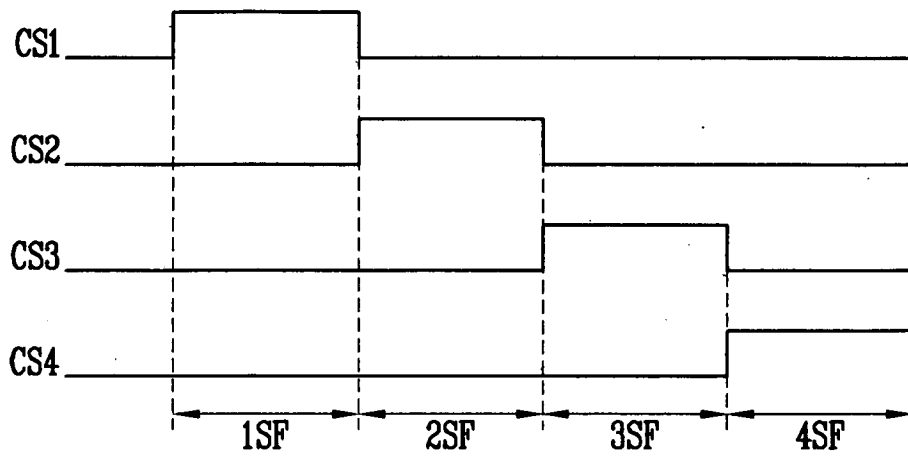


FIG. 9

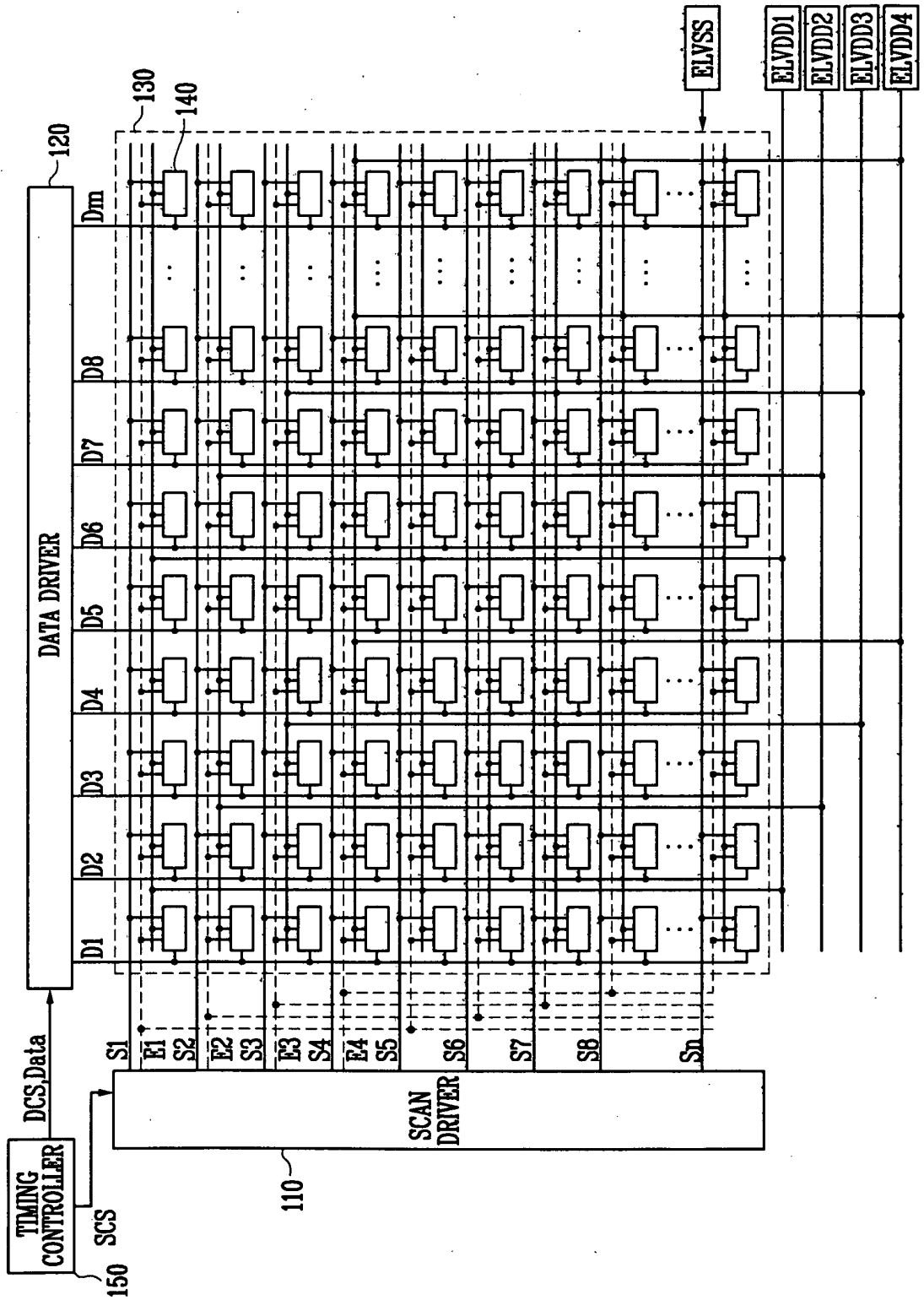


FIG. 10

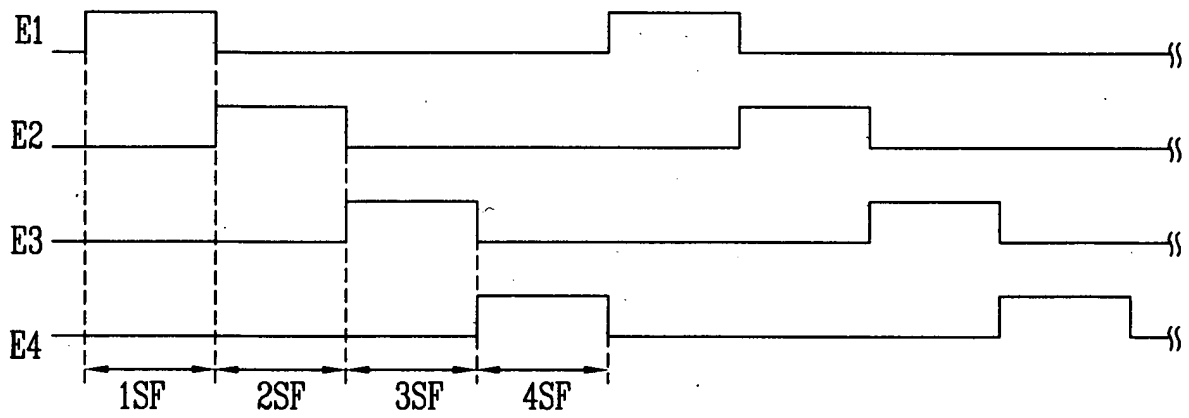


FIG. 11

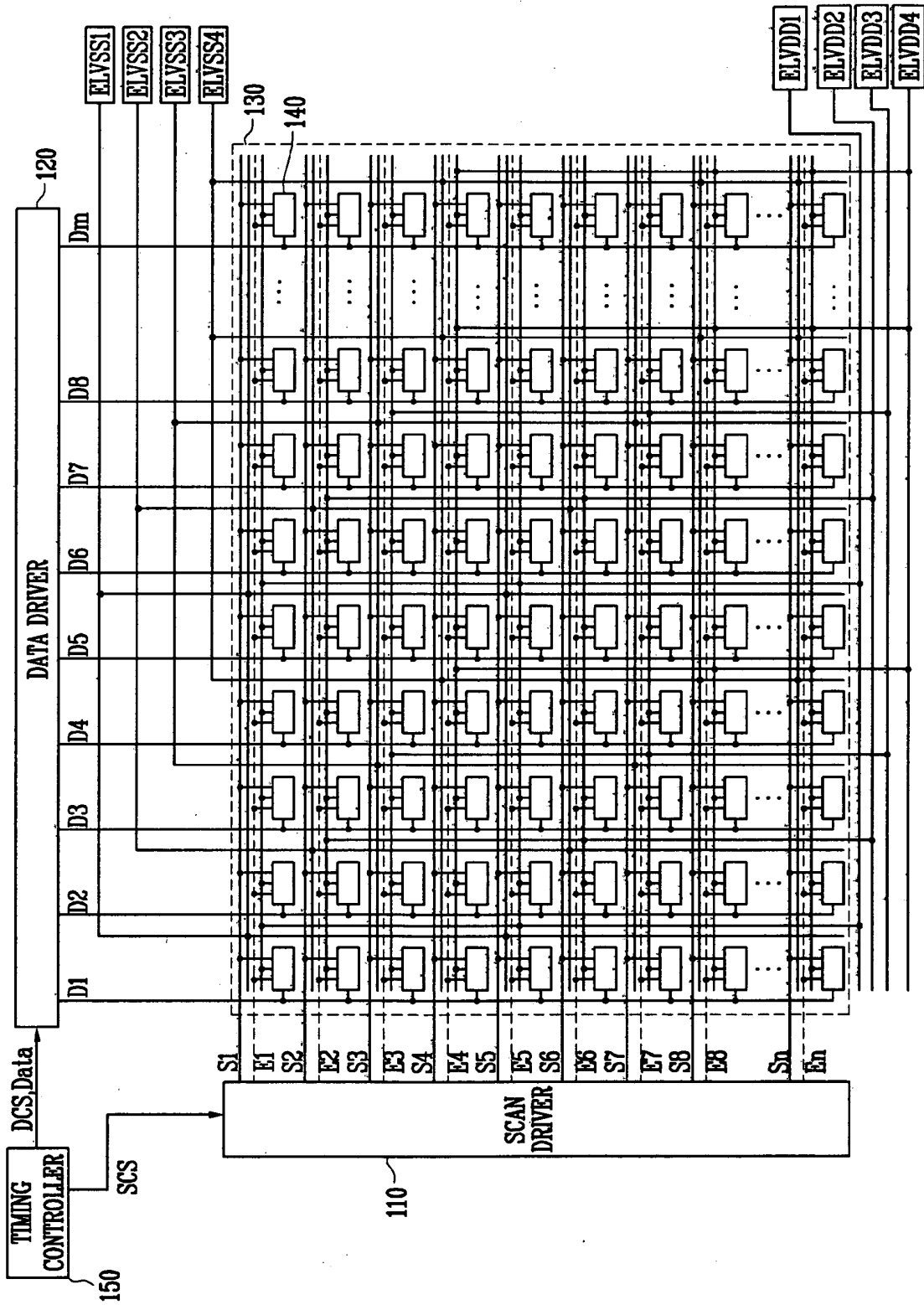


FIG. 12

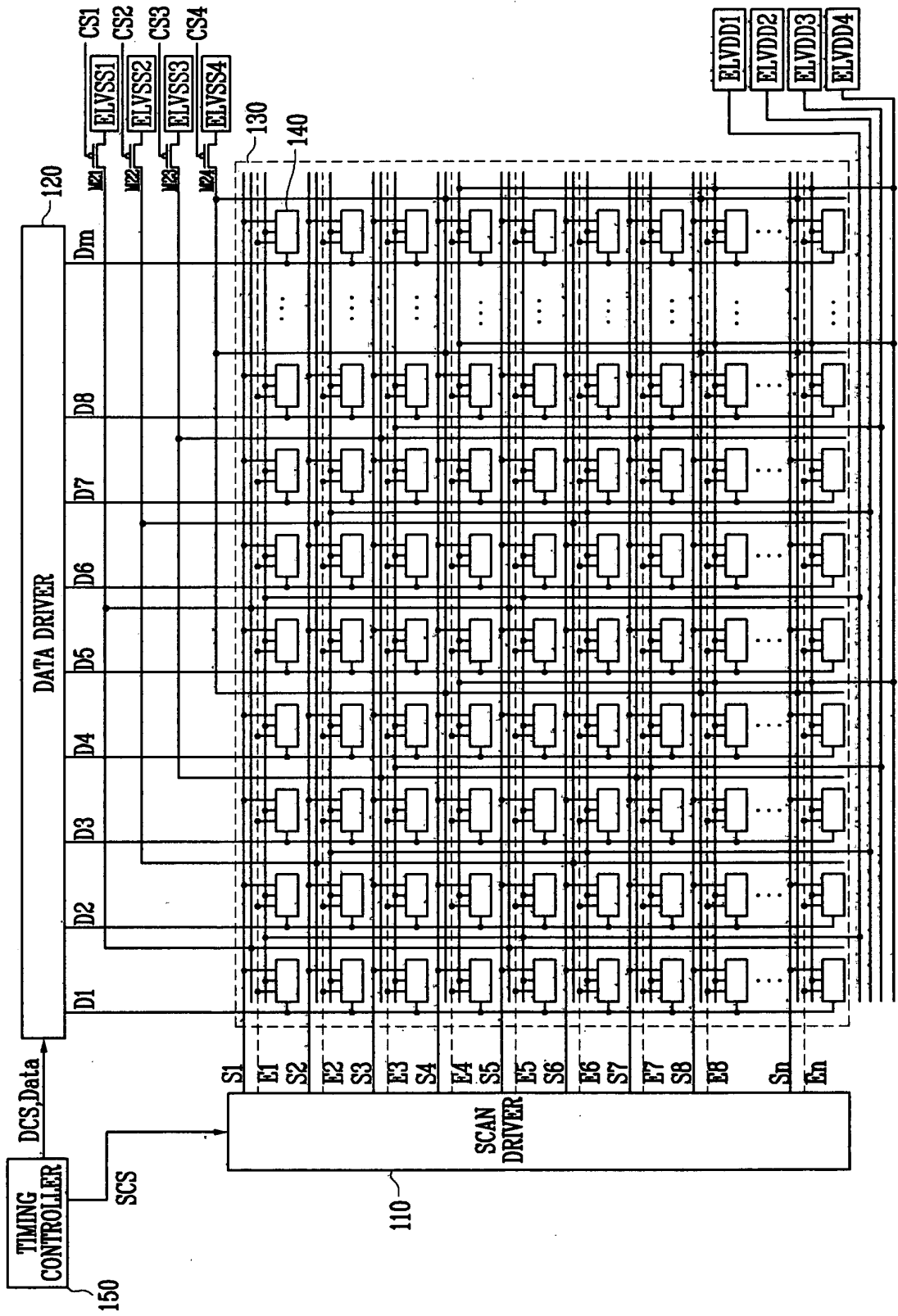


FIG. 13

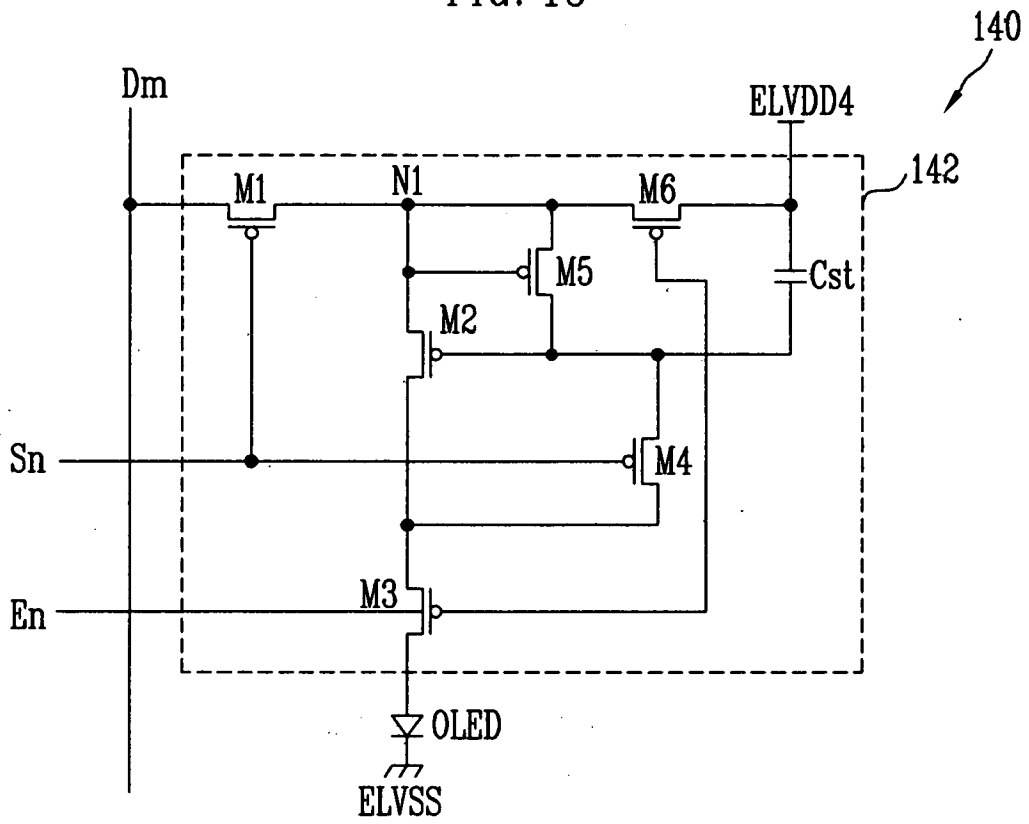
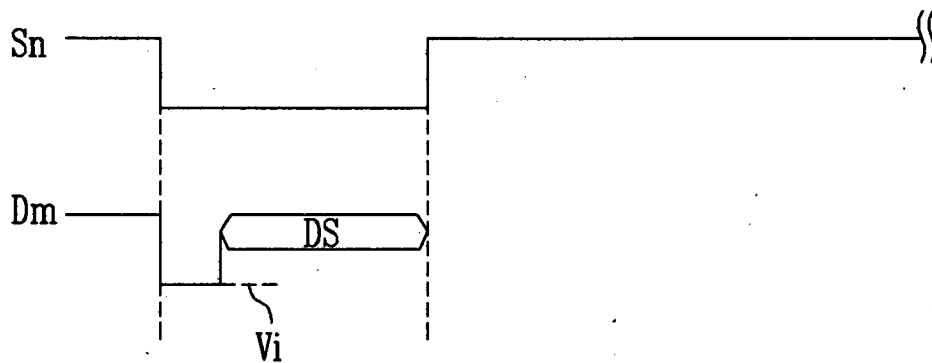


FIG. 14



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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专利名称(译)	有机发光二极管显示器及其驱动方法		
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其他公开文献	EP1675095A3 EP1675095A2		
外部链接	<a href="#">Espacenet</a>		

摘要(译)

有机发光二极管显示器及其驱动方法具有以均匀亮度显示的图像。驱动有机发光二极管显示器的方法包括将一帧分成一个或多个子帧，并且将扫描信号依次提供给每个子帧的像素部分中提供的多条扫描线中的一些扫描线。接收扫描信号的扫描线每个子帧被不同地设置。利用这种配置，以均匀的亮度显示图像。

FIG. 1  
PRIOR ART

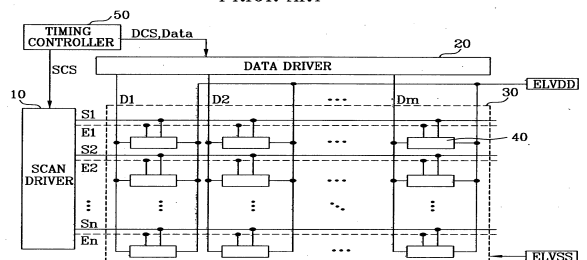


FIG. 2

