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Kim

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(54) **ORGANIC LIGHT EMITTING DISPLAY DEVICE AND METHOD FOR DRIVING THEREOF THAT REDUCES POWER CONSUMPTION IN A STANDBY MODE**

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G09G 3/10 (2006.01)
G09G 3/00 (2006.01)

(52) **U.S. Cl.**

CPC ***G09G 3/3291*** (2013.01); *G09G 3/006* (2013.01); *G09G 2310/0297* (2013.01); *G09G 2310/04* (2013.01); *G09G 2320/0686* (2013.01); *G09G 2330/021* (2013.01)

(58) **Field of Classification Search**

CPC G09G 3/006; G09G 3/3291
USPC 345/77, 904; 315/169.3
See application file for complete search history.

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(57) **ABSTRACT**

A method for driving an organic light emitting display device that is able to minimize power consumption while in a standby mode. In order to decrease power consumption during standby mode, only a portion of the display corresponding to the standby mode display area displays an image while in standby mode, and a remainder of the image producing display displays black. The method includes sequentially supplying a scanning signal to the standby mode display region and the standby mode non-display region, supplying a data signal in response to the image in a data driver when supplying the scanning signal to the standby mode display region and supplying the data signal in response to a black image from an inspecting unit while supplying the scanning signal to the standby mode non-display region.

20 Claims, 4 Drawing Sheets

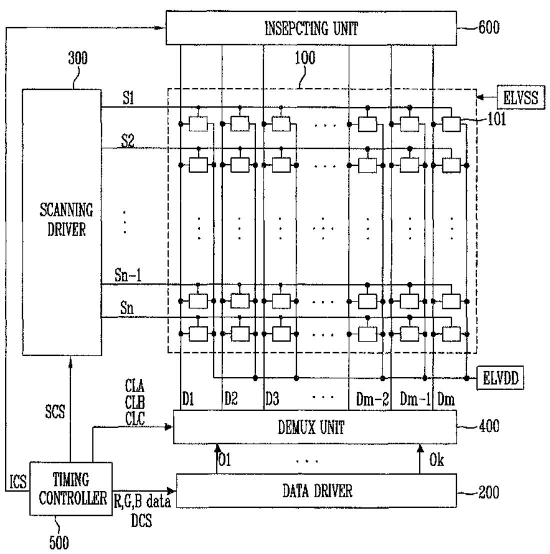

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FIG. 1

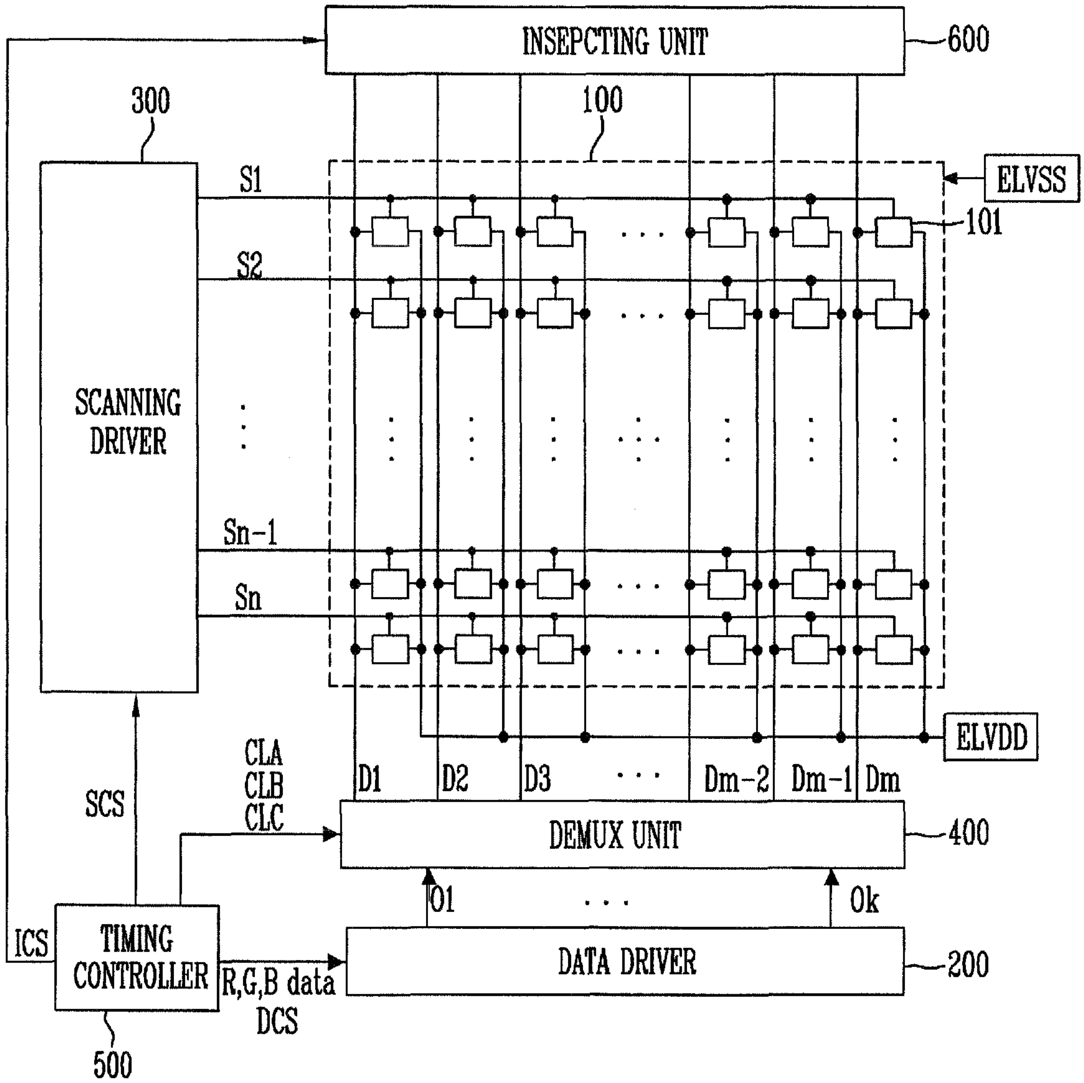

INSEPCTING UNIT
600
300
100
S1
ELVSS
101
S2
SCANNING DRIVER
Sn-1
Sn
ELVDD
CLA
CLB
CLC
D1
D2
D3
Dm-2
Dm-1
Dm
SCS
DEMUX UNIT
400
O1
Ok
ICS
TIMING CONTROLLER
R,G,B data
DCS
DATA DRIVER
200
500

FIG. 2

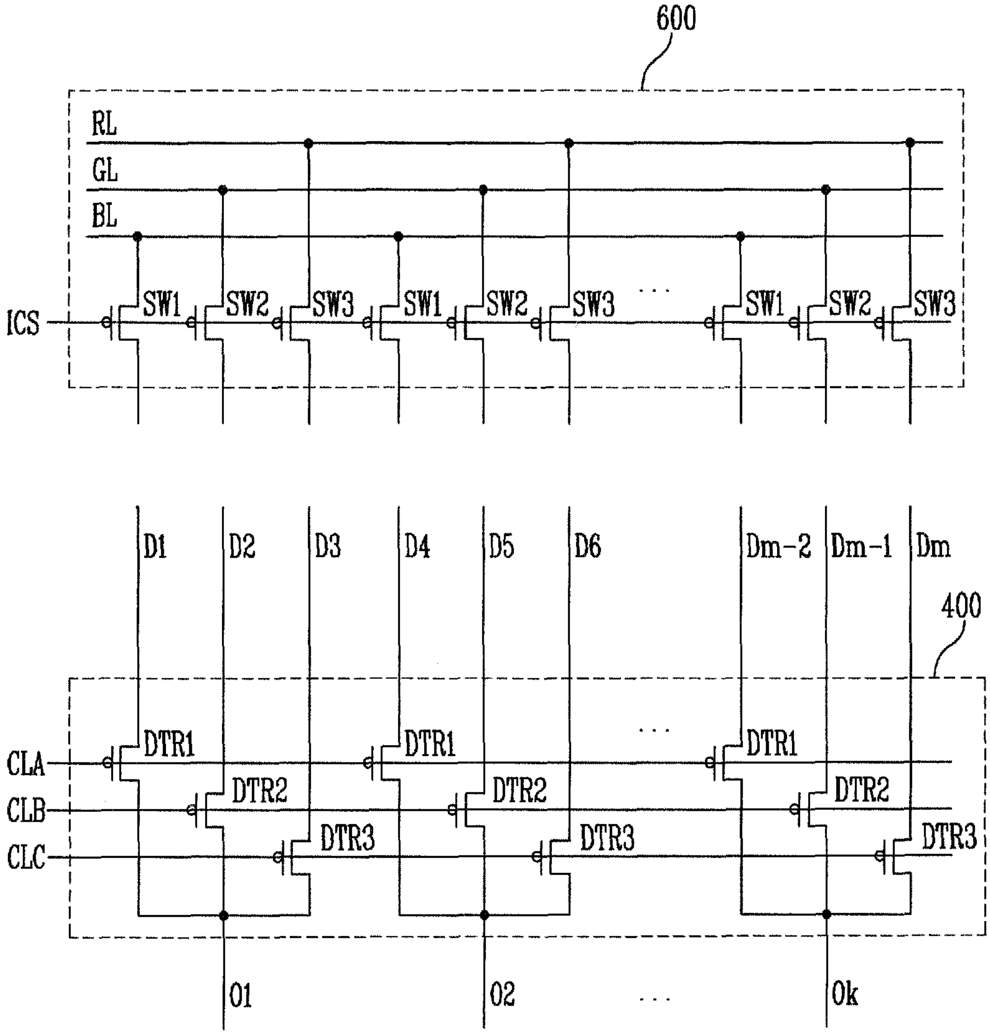

600
RL
GL
BL
ICS
SW1
SW2
SW3
SW1
SW2
SW3
...
SW1
SW2
SW3
D1
D2
D3
D4
D5
D6
Dm-2
Dm-1
Dm
400
CLA
CLB
CLC
DTR1
DTR2
DTR3
DTR1
DTR2
DTR3
...
DTR1
DTR2
DTR3
01
02
...
0k

FIG. 3

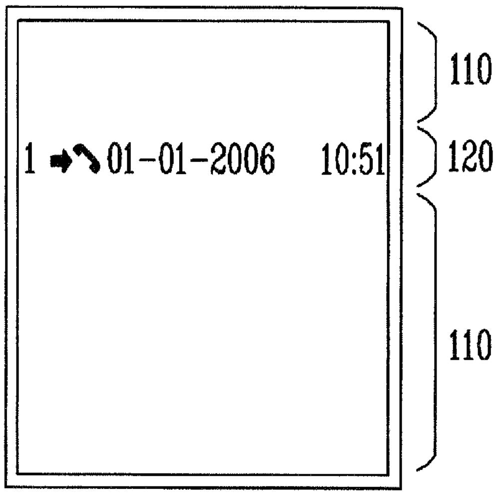

110
1 01-01-2006 10:51
120
110

FIG. 4

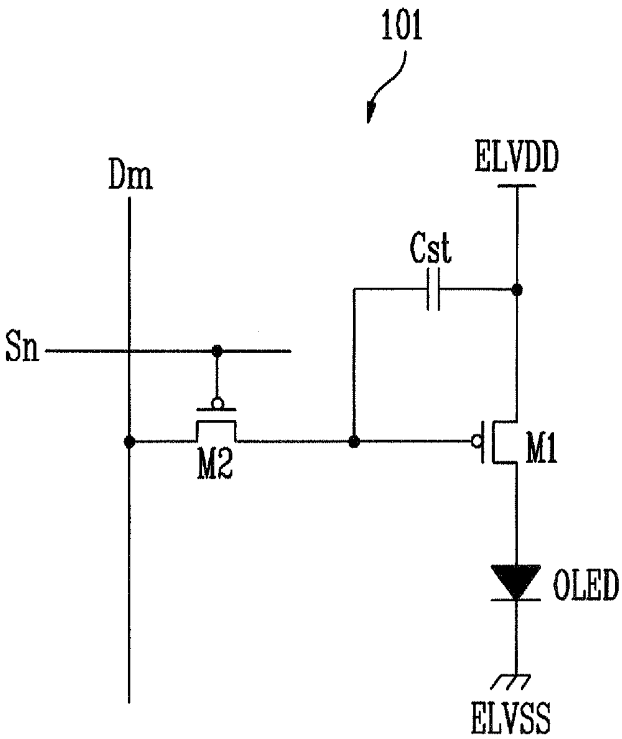
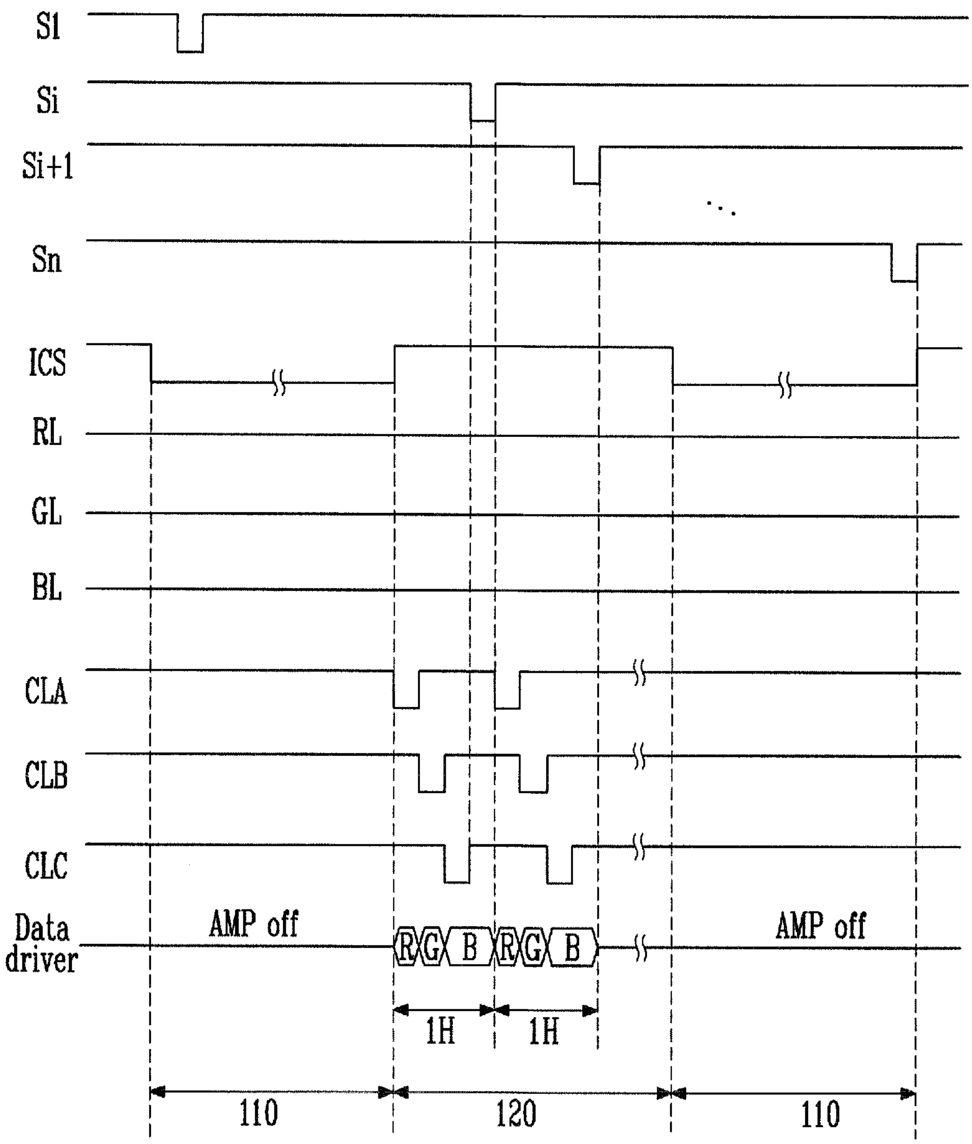

101
Dm
ELVDD
Cst
Sn
M2
M1
OLED
ELVSS

FIG. 5



S1
Si
Si+1
Sn
ICS
RL
GL
BL
CLA
CLB
CLC
Data driver
AMP off
R
G
B
R
G
B
AMP off
1H
1H
110
120
110

ORGANIC LIGHT EMITTING DISPLAY DEVICE AND METHOD FOR DRIVING THEREOF THAT REDUCES POWER CONSUMPTION IN A STANDBY MODE

CLAIM OF PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from an application for ORGANIC LIGHT EMITTING DISPLAY DEVICE AND METHOD FOR DRIVING THEREOF earlier filed in the Korean Intellectual Property Office on 30 Jun. 2010 and there duly assigned Serial No. 10-2010-0062762.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The embodiment relates to an organic light emitting display device that is able to minimize power consumption and a method for driving thereof.

2. Description of the Related Art

Recently, all sorts of flat panel display devices are being developed, in which the flat panel display device has a reduced volume and weight compared to that of a cathode ray tube. The flat panel display device includes a liquid crystal display, a field emission display, a plasma display panel, an organic light emitting display device, and the like.

The organic light emitting display device among the flat panel display devices is the device that an image is displayed using an organic light emitting diode that generates light by electron-hole recombination, and there is an advantage that it has a rapid response time and also can be driven with a low power consumption.

Actually, the organic light emitting display device is in use in various portable devices because it has the advantages, such as a high color reproduction, a thin thickness, and the like. With this configuration, the portable devices are driven as a driving mode for displaying fixed information and a standby mode for minimizing power consumption.

The portable device in the driving mode displays fixed image in response to an input from a user. The portable device in the standby mode displays a fixed image, for example, date, time, and the like in just a portion of a pixel unit to minimize power consumption.

However, when the fixed image is displayed in the portion of the pixel unit, power that is consumed by a data driver is the same for both the driving mode and the standby mode because a data signal in response to one screen is applied. Therefore, a method for minimizing power consumption of the data driver is required.

SUMMARY OF THE INVENTION

The embodiment is to provide an organic light emitting display device that is able to minimize power consumption and a method for driving thereof.

According to one aspect of the embodiment, there is provided a method for driving an organic light emitting display device, including providing the organic light emitting diode (OLED) display device that decreases power consumption when in a standby mode by displaying an image in only a standby mode display region of a pixel unit when in the standby mode while displaying black in a remaining standby mode non-display region of the pixel unit, sequentially supplying a scanning signal to both the standby mode display region and the standby mode non-display region of the pixel unit, supplying a data signal in response to the image via a data driver while the supplying of the scanning signal to the standby mode display region and supplying a data signal corresponding to a black image via an inspecting unit to the standby mode non-display region upon the supplying the scanning signal to the standby mode non-display region.

The inspecting unit may include a plurality of switching elements respectively arranged between a plurality of inspecting lines and a plurality of data lines, the switching elements being turned on when the scanning signal is being supplied to the standby mode non-display region. The inspecting lines may be supplied with a voltage that corresponds to the data signal corresponding to a black image. The method may also include stopping a supply of power to a buffer within the data driver upon the scanning signal being supplied to the standby mode non-display region during the standby mode.

According to another aspect of the present invention, there is provided an organic light emitting display (OLED) device that includes a scanning driver to supply a scanning signal to scanning lines during a driving mode and during a standby mode, a data driver to supply a data signal in response to an image to data lines while the scanning signal is being supplied a standby mode display region during the standby mode, an inspecting unit to supply a black data signal voltage corresponding to a black image to the data lines when the scanning signal is being supplied to the standby mode non-display region during the standby mode and a timing controller to supply an inspecting control signal to the inspecting unit.

The inspecting unit may include a plurality of inspecting lines that are supplied with the voltage corresponding to the black image and a plurality of switching elements that are respectively arranged between the data lines and the inspecting lines and being turned on when the inspecting control signal is being supplied. The timing controller may supply the inspecting control signal when the scanning signal is being supplied to the standby mode non-display region during the standby mode. The OLED display device may also include cutting off a supply of power to a buffer within the data driver upon the scanning signal being supplied to the standby mode non-display region during the standby mode. The OLED display device may also include a demux unit arranged between the data lines and an output of the data driver.

BRIEF DESCRIPTION OF THE DRAWINGS

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 indicated the same or similar components, wherein:

FIG. **1** is an organic light emitting display device according to an embodiment of the present invention;

FIG. **2** is a detailed view of an inspecting unit and a demux unit of FIG. **1** according to an embodiment of the present invention;

FIG. **3** is a view of a display displaying an image during standby mode according to an embodiment of the present invention;

FIG. **4** is a view of a circuit for a pixel of FIG. **1** according to an embodiment of the present invention; and

FIG. **5** is a driving waveform that is supplied when driving in a standby mode according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, certain exemplary embodiments according to the present invention will be described with reference to the accompanying drawings. Here, when a first element is described as being coupled to a second element, the first element may be not only directly coupled to the second element but may also be indirectly coupled to the second element via a third element. Further, some of the elements that are not essential to the complete understanding of the invention are omitted for clarity. Also, like reference numerals refer to like elements throughout.

Hereinafter, the preferable embodiments of the present invention that can be easily implemented by the skilled person who has a general technique in the field including the present invention will be described in more detail with reference to the accompanying FIGS. **1** to **5**.

Turning now to FIG. **1**, FIG. **1** is an organic light emitting display device according to an embodiment of the present invention. Referring to FIG. **1**, the organic light emitting display device according to the embodiment of the present invention includes a scanning driver **300** that drives scanning lines S**1** to Sn, a data driver **200** that drives data lines D**1** to Dm, a pixel unit **100** including a plurality of pixels **101** that are arranged at the intersection between the scanning lines S**1** to Sn and the data lines D**1** to Dm, a demux unit **400** that is connected between the data driver **200** and the data lines D**1** to Dm, an inspecting unit **600** that is arranged to be connected to the data lines D**1** to Dm, and a timing controller **500** that controls the data driver **200**, the scanning driver **300**, the demux unit **400** and the inspecting unit **600**.

The scanning driver **300** is supplied with a scanning driving control signal (SCS) from the timing controller **500**. The scanning driver **300** supplied with the scanning driving control signal (SCS) sequentially supplies scanning signals to the scanning lines S**1** to Sn.

The data driver **200** is supplied with a data driving control signal (DCS) from the timing controller **500**. The data driver **200** supplied with the data driving control signal (DCS) sequentially supplies a plurality of the data signals to output lines O**1** to Ok.

When the organic light emitting display device is driven in a driving mode, the data driver **200** supplies the data signals to all the pixels **101** included in the pixel unit **100** via the output lines O**1** to Ok. When the organic light emitting display device is driven in the standby mode, only a portion of the pixels **101** of pixel unit **100** display an image, this portion being called the standby display area. The standby display area is smaller than the driving display area, so that pixels not in the standby display area are black during standby mode. In standby mode, the data driver **200** supplies the data signals only to pixels **101** that are arranged within the standby display region of pixel unit **100** (the region that is displayed with an image during standby mode) via the output lines O**1** to Ok. In standby mode, the data driver **200** does not supply data signals to the pixels **101** that are not arranged within the standby display region. Actually, the data driver **200** is set to an off state during the period when scanning signals are being supplied to the pixels **101** that are arranged in the standby mode non-display region, so that power consumption can be reduced. For example, during the period for supplying the scanning signal to the pixels **101** that are arranged in the standby mode non-display region, the data driver is set to the off state by not applying power to buffers (not shown) connected to the output lines O**1** to Ok, so that power consumption can be minimized

The demux unit **400** supplies the data signal that is delivered to the output terminal O**1** to Ok of the data driver **200** to the data lines D**1** to Dm. With this configuration, the demux unit **400** delivers a plurality of the data signals that are applied to each output terminal O**1** to Ok to a plurality of the data lines D**1** to Dm. For example, the demux unit **400** can deliver three data signals that are sequentially supplied to one output line O**1** to three data lines D**1**, D**2**, D**3**.

To achieve this, the demux unit **400** is supplied with demux control signals CLA, CLB, CLC from the timing controller **500**. The demux unit **400** supplied with the demux control signals CLA, CLB, CLC delivers three data signals that are supplied to each output line O**1** to Ok to the data lines D**1** to Dm in response to the demux control signals CLA, CLB, CLC.

A test of the organic light emitting display panels should be performed on a sheet unit (or mother substrate) before the organic light emitting display panels are separated from (i.e., scribed-apart from) the mother substrate. The inspecting unit **600** in the present invention supplies voltage, i.e., a black data signal in response to black to the pixels **101** that are arranged in the standby mode non-display region when driving in standby mode. The above-mentioned inspecting unit **600** also supplies fixed inspecting signals to the data lines D**1** to Dm when inspecting the mother substrate before the organic light emitting display panel is separated from the mother substrate. In the embodiment of the present invention, voltage corresponding to black is applied to the data lines D**1** to Dm when driving in the standby mode by using the inspecting unit **600** installed for testing the mother substrate before each organic light emitting display panel is separated from the mother substrate.

The pixel unit **100** includes a plurality of the pixels **101** that are connected to the scanning lines S**1** to Sn and the data lines D**1** to Dm. The pixels **101** are supplied with a second power (ELVSS) having the voltage level that is lower than a first power (ELVDD), and the first power (ELVDD). Each pixel **101** that is supplied with the first power (ELVDD) and the second power (ELVSS) displays the fixed image while controlling the current level that flows to the second power supply (ELVSS) from the first power supply (ELVDD) via the organic light emitting diode (now shown) in response to the data signal.

The timing controller **500** supplies the scanning driving control signal (SCS) to the scanning driver **300** and the data driving control signal (DCS) to the data driver **200**. The timing controller **500** also rearranges the R, G, B data that are supplied from the outside and then supplies them to the data driver **200**. In addition, the timing controller **500** supplies the demux control signals CLA, CLB, CLC to the demux unit **400** and supplies the inspecting control signal (ICS) to the inspecting unit **600**. With this configuration, the inspecting control signal (ICS) is supplied to the standby mode non-display region during the period for supplying the scanning signal when driving in the standby mode.

Turning now to FIG. **2**, FIG. **2** is a detailed view of an inspecting unit **600** and a demux unit **400** of FIG. **1** according to an embodiment of the present invention. For convenience, it is assumed that the demux unit **400** delivers the data signal that is supplied to one output line to three data lines in FIG. **2**.

Referring to FIG. **2**, the demux unit **400** includes a first demux transistor DTR**1**, a second demux transistor DTR**2** and a third demux transistor DTR**3**. The first demux transistors DTR**1** are arranged between ones of every third data line D**1**, D**4**, . . . , Dm-**2** and ones of the output lines O**1** to Ok, respectively. The above-mentioned first demux transistors DTR**1** are turned on when the first demux control signal CLA is supplied, and then supply the data signal from the output line O**1** to Ok to every third data line D**1**, D**4**, . . . , Dm-**2**.

The second demux transistors DTR**2** are arranged between ones of every third data line D**2**, D**5**, . . . , Dm-**1** and ones of the output lines O**1** to Ok, respectively. The above-mentioned second demux transistors DTR2 are turned on when the second demux control signal CLB is supplied, and then supply the data signal from the output lines O1 to Ok to every third data line D2, D5, . . . , Dm-1.

The third demux transistors DTR3 are arranged between ones of every third data line D3, D6, . . . , Dm and ones of the output lines O1 to Ok, respectively. The above-mentioned third transistors DTR3 are turned on when the third demux control signal CLC is supplied, and then supply the data signal from the output lines O1 to Ok to every third data line D3, D6, . . . , Dm.

Meanwhile, the demux transistors DTR1 to DTR3 are repeatedly formed in the order of the first demux transistor DTR1, the second demux transistor DTR2, and the third demux transistor DTR3. With this configuration, the data signal from one output line can be supplied to three data lines D in response to the supplied order of the demux control signals CLA, CLB, CLC.

The inspecting unit **600** includes first switching elements SW1, second switching elements SW2, and third switching elements SW3. The first switching elements SW1 are arranged between the first inspecting line BL and ones of every third data line D1, D4, . . . , Dm-2, respectively. The above-mentioned first switching elements SW1 are turned on when the inspecting control signal ICS is supplied, and then allow every third data line D1, D4, . . . , Dm-2 to be electrically connected to the first inspecting line BL.

The second switching elements SW2 are arranged between the second inspecting line GL and ones of every third data line D2, D5, . . . , Dm-1, respectively. The above-mentioned second switching elements SW2 are turned on when the inspecting control signal ICS is supplied, and then allow the data line D2, D5, . . . , Dm-1 to be electrically connected to the second inspecting line GL.

The third switching elements SW3 are arranged between the third inspecting line RL and ones of every third data line D3, D6, . . . , Dm, respectively. The above-mentioned third switching elements SW3 are turned on when the inspecting control signal ICS is supplied, and then allow the data line D3, D6, . . . , Dm to be electrically connected to the third inspecting line RL.

Meanwhile, the inspecting control signal ICS is supplied from the timing controller **500** during portion of the time that the display is in the standby mode. And, the voltage in response to the high level, i.e., the black data signal is applied to the first to third inspecting line BL, GL, RL during the period for driving the panel as the driving mode and the standby mode. Actually, the first to third inspecting lines BL, GL, RL are used in the test of the mother substrate, and are supplied with the voltage of high level except during the inspecting period.

Turning now to FIG. **3**, FIG. **3** is a view of an image that is displayed on an organic light emitting display device when driving in a standby mode according to an embodiment of the present invention. Referring to FIG. **3**, when driving the organic light emitting display device in the standby mode, the partial region of pixel unit **100** corresponding to region **120** in FIG. **3** is displayed with the fixed image.

When the organic light emitting display device is driven in the standby mode, the standby mode display region **120** and the standby mode non-display region **110** are divided. A date, time, and the like are displayed in the standby mode display region **120** and a black screen is displayed in the standby mode non-display region **110** during standby mode.

With this configuration, the fixed current flows in the pixels arranged in the standby mode display region **120** to display the fixed image. However, the current does not flow in the pixels arranged in the standby mode non-display region **110** that displays black. In other words, when the organic light emitting display device is driven in the standby mode, the amount of current that flows to the pixel unit **100** is smaller than when in driving mode, thereby decreasing power consumption.

Further, there is an advantage in that the black data signal is supplied to the pixels **101** arranged in the standby mode non-display region **110** using the inspecting unit **600**, and also the data driver **200** is set in the off state, so that power consumption can be further decreased.

Turning now to FIG. **4**, FIG. **4** is a circuit view showing a pixel **101** as depicted in FIG. **1** according to an embodiment of the present invention. Referring to FIG. **4**, the pixel **101** according to the embodiment of the present invention include the first transistor M1, the second transistor M2, the storage capacitor Cst, and the organic light emitting diode OLED.

The anode electrode of the organic light emitting diode OLED is connected to the second electrode of the first transistor M1, and the cathode electrode is connected to the second power supply ELVSS. The above-mentioned organic light emitting diode OLED generates light of fixed luminance in response to the current amount that is supplied from the first transistor M1.

The first electrode of the first transistor M1 is connected to the first power supply ELVDD and the second electrode is connected to the anode electrode of the organic light emitting diode OLED. In addition, the gate electrode of the first transistor M1 is connected to one end of the storage capacitor Cst. The above-mentioned first transistor M1 supplies current to the organic light emitting diode OLED in response to the voltage charged in the storage capacitor Cst.

The first electrode of the second transistor M2 is connected to the data line Dm, and the second electrode is connected to one end of the storage capacitor Cst. In addition, the gate electrode of the second transistor M2 is connected to the scanning line Sn. The above-mentioned second transistor M2 is turned on when the scanning signal is supplied to the scanning line Sn, and then supplies the data signal from the data line Dm to one end of the storage capacitor Cst.

The storage capacitor Cst is connected between the first power supply ELVDD and the gate electrode of the first transistor M1. The above-mentioned storage capacitor Cst is charged with a voltage in response to the data signal.

Turning now to FIG. **5**, FIG. **5** is a driving waveform that is supplied when driving in a standby mode according to an embodiment of the present invention. Referring to FIG. **5**, the data driver **200** is set to the off state during the period for supplying the scanning signal to the non-display region **110**. For example, the data driver **200** can be driven by blocking power supplied to the amp (buffer) of the data driver. Simultaneously, the inspecting control signal ICS is supplied to the inspecting unit **600** from the timing controller **500** during the period for supplying the scanning signal to the non-display region **110**.

When the inspecting control signal ICS is supplied to the inspecting unit **600**, the switching elements SW1, SW2, SW3 are turned on. When the switching elements SW1, SW2, SW3 are turned on, each data line D1 to Dm is connected to any one of the first to third inspecting lines BL, GL, RL. With this configuration, the voltage in response to the black data signal is supplied to the first to third inspecting lines BL, GL, RL, so that the black data signal can be supplied to the data lines D1 to Dm.

With this configuration, the pixels **101** are supplied with the black data signal supplied to the data lines D1 to Dm via the inspecting unit **600** during the period when the scanning signal is being supplied to the standby non-display region **110**. Therefore, the pixels **101** arranged in the standby non-display region **110** are set to the non-light emitting state.

The data driver **200** is driven in a normal state during the period when scanning signals are being supplied to the standby mode display region **120**. In other words, three data signals R. G, B are sequentially supplied to each output line O1 to Ok in response to the data driving control signal (DCS) that is sequentially supplied. With this configuration, the data signals are supplied to the data lines D1 to Dm according to the demux control signal CLA, CLB, CLC.

The data signals supplied to the data lines D1 to Dm are supplied to the pixels **101** arranged within the standby mode display region **120** while supplying the scanning signal. With this configuration, the pixels within standby mode display region **120** generate a fixed image in response to the icon that is desired for display.

In the above-mentioned present invention, the data signal is not supplied to the data lines D1 to Dm from the data driver **200** during the period when the scanning signal is being supplied to the standby mode non-display region **110** during the standby mode, so that power consumption can be minimized.

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 spirit and scope of the appended claims, and-equivalents thereof.

What is claimed is:

1. A method, comprising:

providing a mother substrate including at least one organic light emitting diode (OLED) display device;

testing the at least one OLED display device on the mother substrate by supplying from an inspecting unit a plurality of inspecting signals to data lines of the OLED display device; then

separating the at least one OLED display device from the mother substrate; then

sequentially supplying a scanning signal to both a standby mode display region and a standby mode non-display region of a pixel unit of the OLED display device after being separated from the mother substrate and while the OLED display device is in a standby mode;

supplying a data signal in response to a display image via a data driver while the supplying of the scanning signal to the standby mode display region of the pixel unit; and

supplying a data signal corresponding to a black image via the inspecting unit to the standby mode non-display region upon the supplying the scanning signal to the standby mode non-display region of the pixel unit, wherein the inspecting unit supplying the data signal corresponding to the black image is in response to inspecting control signals supplied directly from a timing controller, and wherein the data driver supplying the data signal in response a display image is in response to a data driving control signal supplied directly from the timing controller.

2. The method of claim **1**, wherein the inspecting unit includes a plurality of switching elements respectively arranged between a plurality of inspecting lines and a plurality of data lines, the switching elements being turned on when the scanning signal is being supplied to the standby mode non-display region, wherein the inspecting lines are supplied with a voltage that corresponds to the data signal corresponding to a black image.

3. The method of claim **1**, wherein the data lines include lines D_1 to D_m, wherein the inspecting unit comprises:

a plurality of first switching elements arranged between a first inspecting line and ones of every third data line D_1, $D_4 \ldots D_{m-2}$;

a plurality of second switching elements arranged between a second inspecting line and ones of every third data line D_2, $D_5 \ldots D_{m-1}$;

a plurality of third switching elements arranged between a third inspecting line and ones of every third data line D_3, $D_6 \ldots D_m$, each of the first, second and third switching elements being turned on upon the inspecting control signals being applied, allowing every third data line D_1, $D_4 \ldots D_{m-2}$ to be electrically connected to the first inspecting line, every third data line D_2, $D_5 \ldots D_{m-1}$ to be electrically connected to the second inspecting line, and every third data line D_3, $D_6 \ldots D_m$ to be electrically connected to the third inspecting line, thereby supplying black image data to the data lines, each of the first, second and third switching elements being a single transistor.

4. The method of claim **3**, wherein the inspecting lines are also used to test the mother substrate prior to the separating of the OLED display device from the mother substrate.

5. The method of claim **1**, further comprising stopping a supply of power to a buffer within the data driver upon the scanning signal being supplied to the standby mode non-display region during the standby mode.

6. The method of claim **1**, the inspecting unit supplying a data signal only to non-display portions of the pixel unit and only when the display device is in the standby mode.

7. The method of claim **1**, wherein current does not flow to pixels in the standby mode non-display region of the pixel unit when the display device is in the standby mode.

8. The method of claim **1**, an amount of current that flows to the pixel unit in standby mode is less than an amount of current that flows to the pixel unit in a normal driving mode.

9. The method of claim **1**, wherein the data driver is set to an off state during said supplying the data signal corresponding to the black image via the inspecting unit to the standby mode non-display region of the pixel unit upon the supplying the scanning signal to the standby mode non-display region of the pixel unit.

10. The OLED display device of claim **1**, wherein the OLED display device further includes a demux unit arranged between the data driver and the pixel unit that receives demux control signals from the timing controller and supplies the data signal from the data driver to the pixel unit in response to the demux control signals.

11. The method of claim **1**, the timing controller being directly connected to the inspecting unit, the data driver being external to and separated from the timing controller.

12. An organic light emitting diode (OLED) display device, comprising:

a scanning driver to supply a scanning signal to scanning lines during a driving mode and during a standby mode;

a data driver to supply a data signal representative of an image to data lines in response to a data driving control signal and while the scanning signal is being supplied to a standby mode display region of the pixel unit during the standby mode;

an inspecting unit to supply a black data signal voltage corresponding to a black image to the data lines when the scanning signal is being supplied to a standby mode non-display region of the pixel unit during the standby mode; and a timing controller to directly supply an inspecting control signal to the inspecting unit and to directly supply the data driving control signal to the data driver, the inspecting unit supplying a data signal only to non-display portions of the pixel unit and only when the display device is in the standby mode, the inspecting unit to also supply inspecting signals to the data lines when inspecting the mother substrate and before the OLED display device is separated from the mother substrate.

13. The OLED display device of claim **12**, wherein the inspecting unit comprises:

a plurality of inspecting lines that are supplied with the voltage corresponding to the black image when the OLED display device is in the standby mode, the inspecting lines being also used to test a mother substrate that includes the OLED display device during an inspection of the mother substrate when the OLED display device is attached to the mother substrate; and

a plurality of switching elements that are respectively arranged between the data lines and the inspecting lines and being turned on when the inspecting control signal is being supplied.

14. The OLED display device of claim **13**, the timing controller to supply the inspecting control signal when the scanning signal is being supplied to the standby mode non-display region during the standby mode.

15. The OLED display device of claim **12**, further comprising cutting off a supply of power to a buffer within the data driver upon the scanning signal being supplied to the standby mode non-display region during the standby mode.

16. The OLED display device of claim **12**, further comprising a demux unit arranged between the data lines and an output of the data driver, the timing controller to supply demux control signals to the demux unit to operate the demux unit.

17. The OLED display device of claim **12**, wherein current does not flow to pixels in the pixel unit that are arranged in the standby mode non-display region of the display device when the display device is in the standby mode.

18. The OLED display device of claim **12**, an amount of current that flows to a pixel unit of the display device in the standby mode is less than an amount of current that flows to the pixel unit in the driving mode.

19. The OLED display device of claim **12**, wherein the data driver is set to an off state upon the inspecting unit supplying the black data signal voltage corresponding to the black image to the data lines when the scanning signal is being supplied to the standby mode non-display region of the pixel unit during the standby mode.

20. The OLED display device of claim **12**, wherein the data lines include lines D_1 to D_m, wherein the inspecting unit comprises:

a plurality of first switching elements arranged between a first inspecting line and ones of every third data line D_1, $D_4 \ldots D_{m-2}$;

a plurality of second switching elements arranged between a second inspecting line and ones of every third data line D_2, $D_5 \ldots D_{m-1}$;

a plurality of third switching elements arranged between a third inspecting line and ones of every third data line D_3, $D_6 \ldots D_m$, each of the first, second and third switching elements being turned on upon the inspecting control signals being applied, allowing every third data line D_1, $D_4 \ldots D_{m-2}$ to be electrically connected to the first inspecting line, every third data line D_2, $D_5 \ldots D_{m-1}$ to be electrically connected to the second inspecting line, and every third data line D_3, $D_6 \ldots D_m$ to be electrically connected to the third inspecting line, thereby supplying black image data to the data lines.

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专利名称(译)	有机发光显示装置及其驱动方法，其降低待机模式下的功耗		
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申请(专利权)人(译)	三星移动显示器有限公司. LTD.		
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摘要(译)

一种用于驱动有机发光显示装置的方法，其能够在待机模式下最小化功耗。为了在待机模式期间降低功耗，在待机模式下仅对应于待机模式显示区域的显示器的一部分显示图像，并且图像产生显示的其余部分显示黑色。该方法包括：顺序地向待机模式显示区域和待机模式非显示区域提供扫描信号，当将扫描信号提供给待机模式显示区域时，响应于图像在数据驱动器中提供数据信号，并提供在将扫描信号提供给待机模式非显示区域的同时，响应于来自检查单元的黑色图像的数据信号。