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(54) **Organic light emitting display device and driving method therefor**

Organische lichtemittierende Anzeigevorrichtung und Verfahren zu ihrer Ansteuerung

Dispositif d'affichage électroluminescent organique et son procédé de commande

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Description

BACKGROUND

1. Field of the Invention

[0001] The present invention relates to an organic light emitting display device and a driving method thereof, and more particularly to an organic light emitting display device and a driving method thereof, which solve problems due to a life time variation of red, green, and blue organic light emitting diodes.

2. Discussion of Related Art

[0002] Recently, since liquid crystal display devices and organic light emitting display devices have light-weight and thin characteristics, they have been widely used in a field of portable information devices. In particular, since light emitting display devices have greater useful temperature range, higher resistance to shock or vibration, a wider angle of visibility, and a higher response speed in comparison with other flat pannel display devices including liquid crystal display devices, they have been proposed as the next-generation planar type display devices.

[0003] In general, in an active matrix type organic light emitting display device, one pixel includes R, G, and B unit pixels. Each of the R, G, and B unit pixels includes an organic light emitting diode. In each organic light emitting diode, an R, G, or B organic emission layer is sandwiched between an anode electrode and a cathode electrode. Light is emitted from the R, G, or B organic emission layer as a result of a voltage applied to the anode electrode and the cathode electrode in the organic light emitting diode.

[0004] FIG. 1 is a block diagram showing a conventional active matrix type organic light emitting display device 10.

[0005] With reference to FIG. 1, a conventional active matrix type organic light emitting display device 10 includes a display region 100, a gate drive circuit 110, a data drive circuit 120, and a controller (not shown). The display region 100 includes a plurality of scan lines 111 to 11m, a plurality of data lines 121 to 12n, and a plurality of power supply lines 131 to 13n. Scan signals S 1 to Sm from the gate drive circuit 110 are provided to the plurality of scan lines 111 to 11m. The plurality of data lines 121 to 12n provide data signals DR1, DG1, DB1 ... DRn, DGn, and DBn. The plurality of power supply lines 131 to 13n provide source voltages VDD 1 to VDDn.

[0006] The display region 100 includes a plurality of pixels P11 to Pmn. The plurality of pixels P 11 to Pmn, which are arranged in a matrix, are connected to the plurality of scan lines 111 to 11m, the plurality of data lines 121 to 12n, and the plurality of power supply lines 131 to 13n. Each of the pixels P 11 to Pmn includes 3 unit pixels, namely, R, G, and B unit pixels PR11, PG11, PB11 ... PRmn, PGmn, and PBmn, which are connected to one corresponding scan line, one corresponding data line, and one corresponding power supply line among the plurality of scan lines 111 to 11m, the plurality of data lines 121 to 12n, and the plurality of power supply lines 131 to 13n.

[0007] For example, a pixel P11 disposed at an upper left end of the display region 100 includes an R unit pixel PR11, a G unit pixel PG11, and a B unit pixel PB 11. Further, the pixel P 11 is connected to a first scan line 111 among the scan lines 111 to 11m, a first data line 121 among the data lines 121 to 12n, and a first power supply line 131 among the power supply lines 131 to 13n.

[0008] That is, an R unit pixel PR11 is connected to a first scan line 111, an R data line 121R among the first data lines 121 to which a data signal DR1 is provided, and an R power supply line 131R among first power supply lines 131. A G unit pixel PG11 is connected to the first scan line, a G data line 121G among the first data lines 121 to which a G data signal DG1 is provided, and a G power supply line 131 G among first power supply lines 131. A B unit pixel PB11 is connected to the first scan line 111, a B data line 121B among the first data lines 121 to which a B data signal is provided, and a B power supply 131B among the first power lines 131.

[0009] FIG. 2 is a circuit diagram of each pixel in the conventional organic light emitting display device shown in FIG. 1, which shows a circuit arrangement of one pixel P11 configured by R, G, and B unit pixels.

[0010] Referring to FIG. 2, the R unit pixel PR11 includes a switching transistor M1_R, a drive transistor M2_R, a capacitor C1_R, and an R organic light emitting diode EL1_R. A scan signal S1 from the first scan line 111 is provided to a gate of the switching transistor M1_R, and a data signal DR1 from the R data line 121R is provided to a source of the switching transistor M1_R. A gate of the drive transistor M2_R is connected to a drain of the switching transistor M1_R, and a source voltage VDD 1 from a power supply line 131 R is provided to a source of the drive transistor M2_R. The capacitor C1_R is connected to the gate and source of the drive transistor M2_R. An anode of the R organic light emitting diode EL1_R is connected to a drain of the drive transistor M2_R, and a cathode thereof is connected to a ground voltage VSS.

[0011] In a similar manner, the G unit pixel PG11 includes a switching transistor M1_G, a drive transistor M2_G, a capacitor C1_G, and a G organic light emitting diode EL1_G. A scan signal S 1 from the first scan line 111 is provided to a gate of the switching transistor M1_G, and a data signal DG1 from the G data line 121G is provided to a source of the switching transistor M1_G. A gate of the drive transistor M2_G is connected to a drain of the switching transistor M1_G, and a source voltage VDD1 from a power supply line 131G is provided to a source of the drive transistor M2_G. The capacitor C1_G is connected to the gate and source of the drive transistor M2_G. An anode of the G organic light emitting diode

EL1_G is connected to a drain of the drive transistor M2_G, and a cathode thereof is connected to a ground voltage VSS.

[0012] Further, the B unit pixel PB11 includes a switching transistor M1_B, a drive transistor M2_B, a capacitor C1_B, and a B organic light emitting diode EL1_B. A scan signal S 1 from the first scan line 111 is provided to a gate of the switching transistor M1_B, and a data signal DB 1 from the B data line 121B is provided to a source of the switching transistor M1_B. A gate of the drive transistor M2_B is connected to a drain of the switching transistor M1_B, and a source voltage VDD1 from a power supply line 131B is provided to a source of the drive transistor M2_B. The capacitor C1_B is connected to the gate and source of the drive transistor M2_B. An anode of the B organic light emitting diode EL1_B is connected to a drain of the drive transistor M2_B, and a cathode thereof is a ground voltage VSS.

[0013] In the operation of the display region 100, when a scan signal S 1 is applied to the scan line 111, the switching transistors M1_R, M1_G, and M1_B of R, G, and B unit pixels in the pixel P11 are driven, and R, G, and B data signals DR1, DG1, and DB1 from R, G, and B data lines 121R, 121G, and 121B are applied to the drive transistors M2_R, M2_G, and M2_B, respectively.

[0014] The drive transistors M2_R, M2_G, and M2_B provide a drive current corresponding to a difference between the data signals DR1, DG1, and DB1 applied to the gates thereof and the source voltage VDD1 provided from the R, G, and B power lines 131R, 131G, and 131B, to the organic light emitting diodes EL1_R, EL1_G, and EL1_B, respectively. The organic light emitting diodes EL1_R, EL1_G, and EL1_B are driven by the drive current applied through the drive transistors M2_R, M2_G, and M2_B to drive the pixel P11. The capacitors C1_R, C1_G, and C1_B are used to store the data signals DR1, DG1, and DB1 applied to the R, G, and B data lines 12 1 R, 121G, and 121B.

[0015] An operation of the conventional organic light emitting display device having a construction mentioned above will be described with reference to a drive waveform of FIG. 3.

[0016] First, when the scan signal S1 is applied to the first scan line 111, the first scan line 111 is driven, and pixels P11 to P1n connected to the first scan line 111 are driven.

[0017] That is, switching transistors of R, G, and B unit pixels PR11 to PR1n, PG 11 to PG1n, and PB11 to PB1n of the pixels P11 to P1n connected to the first scan line 111, are driven by the scan signal S 1 applied to the first scan line 111. According to driving of the switching transistors, R, G, and B, data signals D(S1) including DR1 to DRn, DG1 to DGn, and DB1 to DBn from R, G, and B data lines 121R to 12nR, 121G to 12nG, and 121B to 121nB, constituting the first to n^{th} data lines 121 to 12n, are concurrently applied to gates of drive transistors in the R, G, and B unit pixels, respectively.

[0018] The drive transistors of the R, G, and B unit pixels provide drive currents corresponding to R, G, and B data signals D(S1) including DR1 to DRn, DG1 to DGn, and DB1 to DBn respectively applied to R, G, and B data lines 121R to 12nR, 121G to 12nG, and 121B to 121nB, to R, G, and B organic light emitting diodes, respectively. Accordingly, when a scan signal S 1 is applied to the first scan line 111, organic light emitting diodes constituting the R, G, and B unit pixels PR11 to PR1n, PG11 to PG1n, and PB11 to PB1n of the pixels P11 to P1n connected to the first scan line 111, are concurrently driven.

[0019] In the same manner, when a scan signal S2 for driving the second scan line 112 is applied, data signals D(S2) including DR1 to DRn, DG1 to DGn, and DB 1 to DBn from R, G, and B data lines 121R to 12nR, 12 1 G to 121nG, and 121B to 121nB constituting first to n^{th} data lines 121 to 12n, are respectively applied to R, G, and B unit pixels PR21 to PR2n, PG21 to PG2n, and PB21 to PB2n of pixels P21 to P2n connected to a second scan line 112.

[0020] Organic light emitting diodes including R, G, and B unit pixels PR21 to PR2n, PG21 to PG2n, and PB21 to PB2n of pixels P21 to P2n connected to the second scan line 112 are concurrently driven by drive currents corresponding to the data signals D(S2) including DR1 to DRn, DG1 to DGn, and DB1 to DBn.

[0021] By repeating the above mentioned operation, a scan signal Sm is finally applied to an m^{th} scan line 11m, according to data signals D(Sm) including DR1 to DRn, DG1 to DGn, and DB1 to DBn applied to the R, G, and B data lines 121 R to 12nR, 12 1 G to 121nG, and 121 B to 12nB, organic light emitting diodes constituting R, G, and B unit pixels PRm1 to PRmn, PGm1 to PGmn, and PBm1 to PBmn of pixels Pml to Pmn connected to an m^{th} scan line 11m, are concurrently driven.

[0022] Consequently, scan signals S1 to Sm are sequentially applied to the first scan line 111 to the m^{th} scan line 11m. As a result, the pixels P11 to P1n through Pm1 to Pmn connected to scan lines 111 to 11m are sequentially driven to drive the pixels during one frame 1F, so that an image is displayed.

[0023] In the conventional organic light emitting display device having the configuration described above, each pixel includes three R, G, and B unit pixels. A driver, namely, a switching thin film transistor, a drive thin film transistor, and a capacitor are arranged in the R, G, and B unit pixels, and a data line and a common power line provide a data signal and a common power supply to the unit pixels.

[0024] According to a construction of the conventional organic light emitting display device, since each pixel includes three unit pixels, a plurality of wirings and a plurality of elements are arranged in every pixel, the circuit arrangement is complex, and it increases occurrence of defects, thereby deteriorating yield.

[0025] Moreover, as a display device is made with increasingly higher resolution, area of each pixel is reduced. Accordingly, it becomes difficult to arrange a plurality of elements in each pixel and the aperture ratio is reduced.

[0026] In addition, since organic light emitting diodes in R, G, and B unit pixels include emission layers formed by different materials, the life time of the organic light emitting diodes in different unit pixels are different from each other.

[0027] Accordingly, as time goes by, luminance reduction degrees are different in the R, G, and B unit pixels, thereby causing a white balance variation and an image sticking development.

[0028] EP-A-1536406 discloses a display device for displaying a predetermined color during a frame period. The display device includes a plurality of pixels, each said pixel having at least two light emitting elements. Each light emitting element emits a corresponding color within the frame period. Some of the light emitting elements of two adjacent said pixels are grouped into a first light emitting element group and the remaining light emitting elements of the two adjacent said pixels are grouped into a second light emitting element group. The first light emitting element group and the second light emitting element group are time-divisionally driven, each light emitting element being driven within a different subframe within the frame period.

[0029] EP-A-1496495 discloses a pixel circuit in an organic light emitting device which self compensates a threshold voltage, and a method for driving the same. The pixel circuit includes an electroluminescent element for emitting light in response to an applied driving current. A first transistor delivers a data signal voltage in response to a current scan line signal. A second transistor generates a driving current to drive the electroluminescent element in response to the data signal voltage. A third transistor connects the second transistor in the form of a diode in response to a current scan signal to self-compensate the threshold voltage of the second transistor. A fourth transistor delivers a power supply voltage to the second transistor in response to a current light-emitting signal. A fifth transistor provides the driving current, provided from the second transistor, for the electroluminescent element in response to the current light-emitting signal.

[0030] US 2005/200573 discloses red, green, and blue organic electroluminescent (EL) elements formed on a pixel in an organic EL display which are driven by a driving transistor. Emission control transistors are coupled between the driving transistor and the red, green, and blue organic EL elements, respectively. One field is divided into three subfields, and one of the red, green, and blue organic EL elements in each pixel starts to emit light in each subfield to thus represent a full colour screen.

[0031] Accordingly, it is an aspect of the present invention to provide an organic light emitting display device and a driving method thereof, which solve problems due to variation between the life time durations of red, green, and blue organic light emitting diodes by using a time division control drive method for organic light emitting diodes having a relatively longer life time and by using a general drive method for organic light emitting diodes having a relatively shorter life time.

[0032] According to a first aspect of the present invention, an organic light emitting display device and driving method according to the appended claims is provided.

[0033] These and/or other aspects and features of the invention will become apparent and more readily appreciated from the following description of the exemplary embodiments, taken in conjunction with the accompanying drawings of which:

[0034] FIG. 1 is a block diagram showing a conventional organic light emitting display device;

[0035] FIG. 2 is a circuit diagram of each pixel in the conventional organic light emitting display device shown in FIG. 1;

[0036] FIG. 3 is a waveform diagram illustrating an operation of each pixel shown in FIG. 2;

[0037] FIG. 4 is a block diagram showing a configuration of an organic light emitting display device according to an embodiment of the present invention;

[0038] FIG. 5 is a view showing a circuit arrangement of a pixel that is formed at a display region of the organic light emitting display device of FIG. 4; and

[0039] FIG. 6 is a timing chart for input/output signals of the pixel shown in FIG. 5.

DETAILED DESCRIPTION

[0040] Hereinafter, exemplary embodiments according to the present invention will be described with reference to the accompanying drawings. Here, when one element is described to be connected to another element, the element may be directly connected to the other element or indirectly connected to the other element via one or more other elements. Further, some elements are omitted for clarity. Also, like reference numerals refer to like elements throughout.

[0041] FIG. 4 is a block diagram showing a configuration of an organic light emitting display device according to an embodiment of the present invention. The organic light emitting display device of FIG. 4 is one embodiment but the present invention is not limited thereto.

[0042] With reference to FIG. 4, the organic light emitting display device 400 according to an embodiment of the present invention includes a display region 410, a gate drive circuit 430, a data drive circuit 420, and an emission control signal generation circuit 440.

[0043] The gate drive circuit 430 provides scan signals S1 to Sm to a plurality of scan lines of the display region 410 during sub-frames.

[0044] Dividing one frame into predetermined blocks of time configures the sub-frames. In an embodiment of the present invention, one frame is divided by 2 to give two sub-frames.

[0045] Each time a scan signal is applied in sub-frames, the data drive circuit 420 provides R, G, and B data signals DR1 to DRn, DG1 to DGn, and DB1 to DBn to a data line of the display region 410.

[0046] In the described embodiment of the present invention, a pixel 450 includes R, G, and B organic light emitting diodes as an example. Organic light emitting diodes included in each pixel are driven by using a time division control drive method for organic light emitting diodes having a relatively longer life time, namely, R and G organic light emitting diodes, and by using a general drive method for organic light emitting diodes having a relatively shorter life time, namely, B organic light emitting diodes.

[0047] That is, the pixel 450 is divided into a first unit pixel portion 452 and a second unit pixel portion 454. The first unit pixel portion 452 uses a time division drive method by sharing one pixel circuit between the R and G organic light emitting diodes with a relatively longer life time. A B organic light emitting diode having the shortest life time is controlled by the second unit pixel portion 454 that is not driven by the time division drive method.

[0048] Accordingly, R and G data signals are sequentially provided to a data line connected to the first unit pixel portion 452 in sub-frames. When a scan signal is applied to a data line connected to the second unit pixel portion 454 in sub-frames, a B data signal is applied to the data line in the sub-frames.

[0049] Furthermore, the emission control signal generation circuit 440 provides emission control signals E11 to Em1 and E12 to Em2 to respective pixels, wherein the emission control signals (E11, E12) to (Em1, Em2) control an emission of each of the R, G, and B organic light emitting diode included in the unit pixel portions.

[0050] The emission control signals are divided into first emission control signals E11 to Em1 and second emission control signals E12 to Em2. The first emission control signals E11 to Em1 are signals that cause both the first and second unit pixel portions 452 and 454 to emit light in sub-frames, and are provided during a predetermined period of a sub-frame period as a special level (high or low level). The second emission control signals E12 to Em2 function to cause the first unit pixel portion 452 to sequentially emit light in sub-frames, and a voltage level thereof is inverted in consecutive sub-frames.

[0051] For example, when each of the first and second pixel portions 452 and 454 includes a PMOS transistor, the first emission control signals E11 to Em1 of low level are provided during the predetermined time period. In contrast, when each of the first and second pixel portions 452 and 454 includes an NMOS transistor, the first emission control signals E11 to Em1 of high level are provided during the predetermined time period.

[0052] Accordingly, in the first unit pixel portion 452, according to the first and second emission control signals, red and green organic light emitting diodes EL_R and EL_G sequentially emit light in sub-frames. In contrast, the blue organic light emitting diode EL_B of the second unit pixel portion 454 continues to emit light in sub-frames according to the first emission control signal.

[0053] In other words, the display region 410 includes a plurality of scan lines, a plurality of data lines, a plurality of emission control lines, and a plurality of power supply lines. Scan signals S1 to Sm from the gate drive circuit 430 are provided to the plurality of scan lines. Data signals DR1, DG1, DB1, to DRn, DGn, DBn from the data drive circuit 420 are provided to the plurality of data lines. The first emission control signals E11 to Em1 and the second emission control signals E12 to Em2 from the emission control signal generation circuit 440 are provided to the plurality of emission control lines. The plurality of power supply lines provide a source voltage ELVDD. The display region 410 further includes a plurality of the pixels 450 arranged in a matrix pattern, which are connected to the plurality of scan lines, the plurality of data lines, the plurality of emission control lines, and the plurality of power supply lines.

[0054] Here, the pixel 450 includes a plurality of organic light emitting diodes. The described embodiment is characterized in that among at least three organic light emitting diodes included in the pixel 450, those having a relatively longer life time use a time division drive method, and the remaining diodes having a relatively shorter life time use a general drive method. For this purpose, two emission control lines are connected to every pixel 450.

[0055] As one embodiment, in a pixel including R, G, and B organic light emitting diodes, the B organic light emitting diode having the shortest life time is driven by a general drive method, and R and G organic light emitting diodes having relatively longer life times are driven in a time division drive method. Accordingly, as described above, the pixel 450 includes a first unit pixel portion 452 and a second unit pixel portion 454. The first unit pixel portion 452 uses a time division drive method by sharing one pixel circuit between the R and G organic light emitting diodes having relatively longer life times. The second unit pixel portion 454 is configured by the B organic light emitting diode with the shortest life time, that does not use the time division drive method.

[0056] As one embodiment, a first scan signal S 1 is applied to the pixel 450 through a first scan line, and R and G data signals DR1 and DG1 are sequentially provided to the pixel 450 through a first data line. While the R and G data signals are being sequentially provided, a B data signal DB 1 is provided through a second data line, and first and second emission control signals E11 and E12 are provided through first and second emission control lines. As a result, emission times of first and second unit pixel portions 452 and 454 of the pixel 450 are controlled, and a predetermined power supply ELVDD is applied through a power supply line.

[0057] Accordingly, each time a scan signal is applied in sub-frames, corresponding R, G, and B data signals are applied to the respective pixels 450. The R, G, and B organic light emitting diodes are driven according to the emission control signals to emit light corresponding to the R, G, and B data signals, with the result that an image of a predetermined color is displayed for one frame.

[0058] However, in the described embodiment of the present invention, the first unit pixel portion 452 shared by organic light emitting diodes having a relatively longer life time, namely, the R and G organic light emitting diodes, are sequentially driven during a half of one frame period, namely, a sub-frame of one frame period, in a time division drive method. In contrast, the second unit pixel portion 454 including an organic light emitting diode with a shorter life time, namely, the B organic light emitting diode, is driven during every sub-frame, with the result that it is driven during one frame period. This may solve problems due to variation between the life times of the organic light emitting diodes without reducing an aperture ratio of the display region. Although the B diode is provided with a blue data signal during each sub-frame when either the R or the G diodes are being provided with their corresponding red or green data signals, because the B diode is controlled by the first emission control signal, it will emit light during the entire length of one frame period, while the first emission control signal is at an appropriate level.

[0059] That is, the B organic light emitting diode having a shorter life time emits light for one frame period, the R and G organic light emitting diodes having a relatively longer life time sequentially emit light during one half of one frame period. Accordingly, in order to emit the same luminance of light, a current density required by the B organic light emitting diode is less than the current density required by each of the R and G organic light emitting diodes. As a result, a difference between the life time of the B organic light emitting diode and each of the R and G organic light emitting diodes can be reduced.

[0060] In the embodiment of the present invention described above, the R and G organic light emitting diodes are driven by using a time division control drive method. This means that the R and G organic light emitting diodes share one pixel circuit, and are sequentially driven for one frame period.

[0061] That is, one frame is divided into two sub-frames, and the R and G organic light emitting diodes are sequentially driven every sub-frame through the shared pixel circuit, for one frame using a time division drive method. For example, if the time of one frame is divided between two sub-frames, the R organic light emitting diode is driven during one sub-frame and the G organic light emitting diode is driven during the other sub-frame.

[0062] Consequently, in some embodiments of the present invention, the R and G organic light emitting diodes are sequentially driven in a time division drive manner during consecutive sub-frames of one frame. The B organic light emitting diode, on the other hand, continues to be driven for one frame period. As a result, respective pixels emit light of a predetermined color by a combination of R, G, and B colors to display an image.

[0063] In the embodiment of the present invention that has been explained above, each pixel includes R, G, and B organic light emitting diodes wherein the diodes are driven in an order of R and G organic light emitting diodes for two consecutive sub-frames of one frame to sequentially emit light of R and G colors, and the B organic light emitting diode is driven in a general drive manner but not the time division drive manner, so that respective pixels may be embodied by predetermined colors. However, to adjust chromaticity, brightness or luminance, an emission order of the R, G, and B, organic light emitting diodes may be optionally changed. In other embodiments, the emission order may be R, G, B, and W. Otherwise, one frame is divided into at least three sub-frames and at least one of the R, G, and B colors can be further emitted during a remaining sub-frame.

[0064] Namely, for remaining unit pixel portions except a unit pixel portion including an organic light emitting diode having the shortest life time among the R, G, B, and W organic light emitting diodes, one frame is divided into a plurality of sub-frames, and this can be driven in a time division drive manner. So, the unit pixel portion including the organic light emitting diode with the shortest life time is driven continuously during a frame period while the frame period is divided into sub-frames for driving the unit pixel portions including the organic light emitting diodes with relatively longer life times. These unit pixel portions are driven sequentially during the sub-frames such that the time of a frame is divided between them. Continuous driving indicates that an appropriate data signal is being provided to the unit pixel portion for all sub-frames of one frame period. Sequential driving indicates that data signals corresponding to different colors are provided to the unit pixel portions one after the other.

[0065] FIG. 5 is a view showing a circuit arrangement of a pixel that is formed at a display region of the organic light emitting display device according to an embodiment of the present invention. FIG. 6 is a timing diagram for input/output signals of the pixel shown in FIG. 5.

[0066] The circuit arrangement of the pixel shown in FIG. 5 is an exemplary embodiment of the present invention, but the pixel is not limited to the arrangement shown.

[0067] With reference to FIG. 5, each pixel 450 of the organic light emitting display device according to an embodiment of the present invention includes a plurality of unit pixel portions. Each of the pixel is configured to be divided into the first unit pixel portion 452 and the second unit pixel portion 454 according to whether its driven with a time division driving method or not.

[0068] That is, as shown, assuming that the pixel includes the R, G, and B organic light emitting diodes, life times of the organic light emitting diodes are compared with each other. As the result of the comparison, the R and G organic light emitting diodes having relatively longer life time share one pixel circuit 500 and are configured as the first unit pixel portion 452 using a time division drive method. The B organic light emitting diode having a shorter life time is configured as the second unit pixel portion 454 that does not use the time division drive method.

[0069] Accordingly, the first unit pixel portion 452 is coupled with the first and second emission control lines. In the first unit pixel portion 452, R and G organic light emitting diodes sequentially emit light during consecutives halves of one frame, namely, in sub-frames responsive to the first and second emission control signals Em1 and Em2. In contrast, the second unit pixel portion 454 is coupled with the first emission control line, and a B organic light emitting diode in the second unit pixel portion 454 emits light responsive to the first emission control signal Em1 for one frame.

[0070] As shown in FIG. 6, the first emission control signal Em1 functions to cause the first and second unit pixel portions 452 and 454 to emit light in sub-frames, and the first emission control signal of a special level (low or high level) is provided during a predetermined period of the sub-frame period. The second emission control signal Em2 functions to cause the first unit pixel portion 452 to sequentially emit light in sub-frames wherein a voltage level thereof is inverted in sub-frames. So, the voltage level of the second emission control signal Em2 during one sub-frame is inverted with respect to the voltage level of the second emission control signal Em2 during a next sub-frame.

[0071] Since in the embodiment of the present invention that has been described above, the unit pixel portion includes a PMOS transistor, it is understood that the first emission control signal Em1 is provided during a predetermined time period as a low level. In other words, in the exemplary pixel 450 shown, the transistors receiving the first emission control signal Em1 at their gate terminals are depicted as PMOS transistors. As a result, a low level first emission control signal Em1 is used to turn these transistors on.

[0072] As described above, the B organic light emitting diode having a shorter life time emits light for one frame period, the R and G organic light emitting diodes having a relatively longer life time sequentially emit light during halves of one frame period. Accordingly, in order to emit the same luminance of light, a current density necessary for the B organic light emitting diode is less than a current density necessary for each of the R and G organic light emitting diodes, with the result that a difference between the life time of the B organic light emitting diode and each of the R and G organic light emitting diodes can be reduced.

[0073] Referring to FIG. 5, the pixel 450 includes two scan lines, two data lines, a first emission control line, and a second emission control line. The scan lines provide scan signals Sm and Sm-1. One of the data lines provides data signals DRn and DGn to the first unit pixel portion 452. The other data line provides a data signal DBn to the second unit pixel portion 454. The first emission control line is coupled to the first and second unit pixel portions 452 and 454 in common, and provides the first emission control signal Em1 thereto. The second emission control line is coupled to the second unit pixel portion 454, and provides the second emission control signal Em2 thereto. Power supply lines are coupled with the first and second unit pixel portions 452 and 454, and supply the first power supply ELVDD thereto.

[0074] Furthermore, the first unit pixel portion 452 includes the pixel circuit 500 for driving the R and G organic light emitting diodes. The second unit pixel portion 454 includes a pixel circuit 501 for driving the B organic light emitting diode. An anode electrode of each of the organic light emitting diodes is coupled with the pixel circuits 500, 501, and a cathode electrode of each diode is coupled with a second power supply ELVSS.

[0075] A voltage less than the voltage of the first power supply ELVDD, for example a ground voltage, is set as the second power supply ELVSS. Moreover, the organic light emitting diodes generate any one of red, green, and blue colors corresponding to an electric current provided from the pixel circuit 500, 501. The R and G organic light emitting diodes are included in the first unit pixel portion 452, and share the same pixel circuit 500.

[0076] The pixel circuit 500 includes a storage capacitor C, a first transistor M1, a second transistor M2, a third transistor M3, a fourth transistor M4, a fifth transistor M5, and a sixth transistor M6. The storage capacitor C and the sixth transistor M6 are coupled in series between the first power supply ELVDD and an initialization power supply Vinit. The fourth transistor M4, the first transistor M1, and the fifth transistor M5 are coupled in series between the first power supply ELVDD and an organic light emitting diode OLED. The third transistor M3 is coupled between a gate electrode and a first electrode of the first transistor M1. The second transistor M2 is coupled between a data line and a second electrode of the first transistor M1.

[0077] For each transistor, either a drain electrode or a source electrode is set as a first electrode, and an electrode other than the first electrode is set as a second electrode. For example, when the source electrode is set as the first electrode, the drain electrode is set as the second electrode.

[0078] The first to sixth transistors M1 to M6 are shown in FIG. 5 as PMOS transistors, but embodiments of the present invention are not limited thereto. When the first to sixth transistors M1 to M6 are embodied by NMOS transistors, as known in the art, polarity of a drive waveform is inverted.

[0079] The second unit pixel portion 454, includes the pixel circuit 501. The pixel circuit 501 includes transistors M1', M2', M3', M4', M5', and M6' and the capacitor C' that are coupled together in substantially the same manner as their corresponding components of the pixel circuit 500. In the pixel circuit 501 of the second unit pixel portion 454, the second electrode of the transistor M1' is coupled with a B organic light emitting diode through the transistor M5'. A gate electrode of the transistor M1' is coupled to the storage capacitor C'. The transistor M1' provides an electric current corresponding to a voltage charged in the storage capacitor C', to the organic light emitting diode EL_B that is coupled to the pixel circuit 501.

[0080] In contrast, in the case of the first unit pixel portion 452, the pixel circuit 500 is coupled to the R and G organic light emitting diodes through a seventh transistor M7 and an eighth transistor M8, respectively. Since a second emission control line is further coupled to the first unit pixel portion 452 in order to sequentially drive the R and G organic light emitting diodes for one half of one frame, namely, during a sub-frame, the second electrode of the first transistor M1 is coupled with the R and G organic light emitting diodes through the fifth and seventh transistor M5 and M7 or the fifth and eighth transistors M5 and M8.

[0081] The structure of pixel circuit 500 will be described below. The structure of the pixel circuit 501 is substantially the same. In the pixel circuit 500 of the first unit pixel portion 452, a first electrode of the third transistor M3 is coupled with the first electrode of the first transistor M1, and a second electrode of the third transistor M3 is coupled with a gate electrode of the first transistor M1. A gate electrode of the third transistor M3 is coupled with an m^{th} scan line. When a scan signal Sm is supplied to the m^{th} scan line, the third transistor M3 is turned on, so that the first transistor M1 is diode-connected.

[0082] A first electrode of the second transistor M2 is coupled with a data line, and a second electrode thereof is coupled with the second electrode of the first transistor M1. A gate electrode of the second transistor M2 is coupled with the m^{th} scan line receiving the scan signal Sm. When the scan signal Sm is provided to the m^{th} scan line, the second transistor M2 is turned on, so that a data signal DRn or DGn supplied to the data line is supplied to the second electrode of the first transistor M1.

[0083] A first electrode of the fourth transistor M4 is coupled with the first power supply ELVDD, and a second electrode thereof is coupled with the first transistor M1. A gate electrode of the fourth transistor M4 is coupled with an emission control line receiving the first emission control signal Em1. When an emission control signal is not being supplied (i.e., when the signal is low), the fourth transistor M4 is turned on to electrically connect the first power supply ELVDD and the first transistor M1 to each other.

[0084] In the case of the second unit pixel portion 454, a first electrode of the transistor M5' is coupled with the transistor M1', and a second electrode of the transistor M5' is coupled with the B organic light emitting diode EL_B. A gate electrode of the transistor M5' is coupled with the first emission control line. When the first emission control signal Em1 of a low level is provided to the transistor M5', the transistor M5' is turned on, to electrically connect the transistor M1' and the B organic light emitting diode EL_B of the second unit pixel portion 454.

[0085] However, in the case of the first unit pixel portion 452, to sequentially drive the R and G organic light emitting diodes during one half of one frame, a second emission control line is further provided that receives the second emission control signal Em2.

[0086] Accordingly in the first unit pixel portion 452, the seventh transistor M7 is further provided between the fifth transistor M5 and the R organic light emitting diode, and the eighth transistor M8 is further provided between the fifth transistor M5 and the G organic light emitting diode.

[0087] In the exemplary embodiment shown in FIG. 5, the seventh transistor M7 is a PMOS transistor, whereas the eighth transistor M8 is an NMOS transistor. The purpose is to cause one of the two organic light emitting diodes not to emit light when one frame is divided into two sub-frames and while the other organic light emitting diode of the first unit pixel portion emits light.

[0088] Accordingly, the second emission control line is coupled with gate electrodes of the seventh and eighth transistors M7 and M8. The second emission control signal Em2 for sequentially driving the R and G organic light emitting diodes of the first unit pixel portion 452 is supplied to the second emission control line.

[0089] A second electrode of the sixth transistor M6 is coupled with the storage capacitor C and the gate electrode of the first transistor M1, and a first electrode of the sixth transistor M6 is coupled with the initialization power supply Vinit. Further, a gate electrode of the sixth transistor M6 is coupled with an $(m-1)^{th}$ scan line receiving a scan signal Sm-1. When the scan signal Sm-1 is supplied to the $(m-1)^{th}$ scan line, the sixth transistor M6 is turned on to initialize the storage capacitor C and the gate electrode of the first transistor M1. To do this, a voltage value of the initialization power supply Vinit is set to be less than that of a data signal.

[0090] Operation of the pixel 450 having the construction described above will be illustrated with reference to FIG. 6. During a predetermined time period of a first sub-frame, as the first emission control signal Em1 of a low level and the second emission control signal Em1 of a high level are supplied to the pixel, the green G organic light emitting diode of the first unit pixel portion 452 and the blue B organic light emitting diode of the second unit pixel portion 454 emit light concurrently. This period is shown as a Green, Blue emission period in FIG. 6.

[0091] Moreover, during a predetermined time period of the second sub-frame, as the first emission control signal Em1 of a low level and the second emission control signal Em1 of a low level are supplied to the pixel, the red R organic light emitting diode of the first unit pixel portion 452 and the blue B organic light emitting diode of the second unit pixel portion 454 emit light concurrently. This period is shown as a Red, Blue emission period on FIG. 6.

[0092] As a result, with reference to FIGs. 5 and 6, in the first unit pixel portion 452, one frame is divided into two sub-frames. Through the shared pixel circuit 500, the G and B organic light emitting diodes are sequentially driven by the first and second emission control signals Em1 and Em2 in a time division drive method for each sub-frame of one frame period. In the second unit pixel portion 454, the B organic light emitting diode is driven by the first emission control signal Em1 regardless of the time division drive method. Consequently, respective pixels emit light of predetermined color by a combination of R, G, and B colors, with the result that an image is displayed.

[0093] That is, in some embodiments of the present invention, the B organic light emitting diode having a shorter life time emits light for one frame period, and R and G organic light emitting diodes having relatively longer life time sequentially emit light each during one half of one frame. Accordingly, in order to emit the same luminance of light, a current density necessary for the B organic light emitting diode is less than that necessary for each of the R and G organic light emitting diodes, with the result that a life time difference between the B organic light emitting diode and each of the R and G organic light emitting diodes can be reduced.

[0094] As described above, according to the described embodiments of the present invention, organic light emitting diodes that have a relatively longer life time are driven using a time division drive method, whereas the remaining organic light emitting diodes having relatively shorter life times are driven using a general drive method. Problems due to differences between duration of life time of different organic light emitting diodes can be solved without reducing aperture ratio. Namely, white balance variation and image sticking phenomenon that are due to a difference in the degree of luminance reduction with passage of time in R, G, and B organic light emitting diodes may be solved.

[0095] Although certain exemplary embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes might be made to these embodiments without departing from the scope of the invention which is defined in the claims and their equivalents.

Claims

1. An organic light emitting display device (400) comprising:

   a gate drive circuit (430) for generating scan signals (S1-Sm) and providing the scan signals (S1-Sm) to a plurality of scan lines;
   a data drive circuit (420) for providing data signals (DR1-DRn, DG1-DGn, DB1-DBn) to a plurality of data lines;
   an emission control signal generation circuit (440) for generating first and second emission control signals (E11-Em1, E12-Em2) and for providing the first and second emission control signals (E11-Em1, E12-Em2) to a plurality of emission control lines to control the emission of a plurality of organic light emitting diodes (EL_R, EL_G, EL_B); and
   a display region (410) including a plurality of pixels (450)arranged in a matrix, the pixels (450) being coupled to the plurality of scan lines, the plurality of data lines, the plurality of emission control lines, and a plurality of power lines,
   wherein each of the plurality of pixels (450) is divided into a first unit pixel portion (452) and a second unit pixel portion (454), the first unit pixel portion (452) comprising a first pixel circuit (500) and at least two organic light emitting diodes (EL_R, EL_G), wherein the at least two organic light emitting diodes (EL_R, EL_G) of the first unit pixel portion (452) are arranged to be driven using the first pixel circuit (500) using a time division driving method,
   characterised in that:

   the second unit pixel portion (454) comprises a second pixel circuit (501) connected to only one organic light emitting diode (EL_B),
   and the organic light emitting diode (EL_B) of the second unit pixel portion (454) is arranged to be driven using the second pixel circuit (501).

2. An organic light emitting display device (400) according to claim 1,
   wherein the time division driving method is arranged to sequentially provide at least two data signals to the first unit pixel portion (452) through a first data line in one frame, each one frame being divided into predetermined blocks of time to form sub-frames.

3. An organic light emitting display device (400) according to claim 1 or 2, wherein said at least two organic light emitting diodes (EL_R, EL_G) in the first unit pixel portion (452) comprise organic light emitting diodes not having the shortest life times among the organic light emitting diodes (EL_R, EL_G, EL_B) in the pixels (450).

4. An organic light emitting display device (400) according to claim 3,
   wherein said at least two organic light emitting diodes (EL_R, EL_G) in the first unit pixel portion (452) comprise a red organic light emitting diode (EL_R) and a green organic light emitting diode (EL_G).

5. An organic light emitting display device (400) according to any one of the preceding claims, wherein said one organic light emitting diode (EL_B) in the second unit pixel portion (454) comprises an organic light emitting diode having the shortest life time among the organic light emitting diodes (EL_R, EL_G, EL_B) in the pixels (450).

6. An organic light emitting display device (400) according to claim 5,
   wherein said one organic light emitting diode (EL_

B) in the second unit pixel portion (454) comprises a blue organic light emitting diode (EL_B).

7. An organic light emitting display device (400) according to any one of claims 2 to 6, wherein red and green data signals (DRn, DGn)are provided in sequential sub-frames to data lines coupled to the first unit pixel portion (452) from among the plurality of data lines.

8. An organic light emitting display device (400) according to any one of claims 2 to 7, wherein a blue data signal (DBn) is provided in each sub-frame of one frame period to a data line coupled to the second unit pixel portion (454) from among the plurality of data lines.

9. An organic light emitting display device (400) according to any one of claims 2 to 8,
wherein the first emission control signal (E11-Em1) of a low level is provided in the sub-frames, and wherein the first and second unit pixel portions (452, 454) each include a PMOS transistor for receiving the first emission control signal (E11-Em1), and
wherein the first and second unit pixel portions (452, 454) are arranged to emit light in the sub-frames responsive to the low level of the first emission control signal (E11-Em1).

10. An organic light emitting display device (400) according to any one of claims 2 to 8,
wherein the first emission control signal (E11-Em1) of a high level is provided in the sub-frames, and wherein the first and second unit pixel portions (452, 454) each include an NMOS transistor for receiving the first emission control signal (E11-Em1), and
wherein the first and second unit pixel portions (452, 454) are arranged to emit light in the sub-frames responsive to the high level of the first emission control signal (E11-Em1).

11. An organic light emitting display device (400) according to any one of claims 1 to 10, wherein the first unit pixel portion (452) is arranged to sequentially emits lights having different colors responsive to the second emission control signal (E12-Em2) having a signal level being inverted in consecutive sub-frames.

12. An organic light emitting display device (400) according to any one of claims 1 to 11, wherein each of the pixel circuits (500, 501) comprises:

a storage capacitor (C, C') and a sixth transistor (M6, M6') coupled in series between a first power supply ELVDD and an initialization power supply (Vinit);
a fourth transistor (M4, M4'), a first transistor (M1, M1'), and a fifth transistor (M5, M5') coupled in series between the first power supply (ELVDD) and an organic light emitting diode (EL_R, EL_G, EL_B);
a third transistor (M3, M3') coupled between a gate electrode and a first electrode of the first transistor (M1, M1'); and
a second transistor (M2, M2') coupled between one of the plurality of data lines and a second electrode of the first transistor (M1, M1').

13. An organic light emitting display device (400) according to claim 12,
wherein the first (M1, M1'), second (M2, M2'), third (M3, M3'), fourth (M4, M4'), fifth (M5, M5'), and sixth (M6, M6') transistors are PMOS transistors.

14. An organic light emitting display device (400) according to claim 12 or 13, wherein the first unit pixel portion (452) further comprises a seventh transistor (M7), and an eighth transistor (M8), the seventh (M7) and the eighth (M8) transistors respectively coupled between red (EL_R) and green (EL_G) organic light emitting diodes and the fifth transistor (M5).

15. An organic light emitting display device according to claim 14,
wherein the seventh transistor (M7) is a PMOS transistor, and the eighth transistor (M8) is an NMOS transistor.

16. An organic light emitting display device (400) according to claim 14 or 15, wherein a second emission control line (E12-Em2) from among the plurality of emission control lines is coupled to a gate electrode of the seventh transistor (M7) and a gate electrode of the eighth transistor (M8), and the second emission control signal is arranged to provide to the second emission control line for sequentially driving the red and green organic light emitting diodes (EL_R, EL_G) of the first unit pixel portion (452).

17. An organic light emitting display device (400) according to claim 1,
wherein the first unit pixel portion (452) comprises a first pixel circuit (500) shared between at least two of the organic light emitting diodes (EL_R, EL_G), and
wherein the second unit pixel portion (454) comprises one of the organic light emitting diodes (EL_B) having a shortest life time among the organic light emitting diodes (EL_R. EL_G, EL_B).

18. An organic light emitting display device (400) according to any one of claims 1 to 8 or 17, wherein the first emission control signal (E11-Em1) is provided in a sub-frame period as a signal having low or high level.

19. An organic light emitting display device (400) according to claim 18,

wherein the first and second unit pixel portions (452, 454) each include an NMOS transistor or an PMOS transistor for receiving the first emission control signal (E11, Em1);
wherein the first emission control signal (E11-Em1) of a low level is arranged to be provided when the unit pixel portion comprises a PMOS transistor, and wherein the first emission control signal (E11-Em1) of the high level is arranged to be provided when the unit pixel portion comprises an NMOS transistor.

20. An organic light emitting display device (400) according to any one of claims 1 to 19,
wherein the first unit pixel portion (452) is arranged to sequentially emit light in sub-frames responsive to the second emission control signal (E12-Em2), and
wherein a signal level of the second emission control signal (E12-Em2) is inverted in consecutive sub-frames.

21. An organic light emitting display device (400) according to any one of claims 17 to 20, wherein the first unit pixel portion (452) further comprises a plurality of transistors coupled respectively between the first pixel circuit (500) and the at least two of the organic light emitting diodes (EL_R, EL_G), the plurality of transistors being arranged to receive the second emission control signal (E12, Em2).

22. A method for driving an organic light emitting display device (400) including a pixel (450) having first and second unit pixel portions (452, 454), the first unit pixel portion (452) including a first pixel circuit (500) shared by at least two organic light emitting diodes (EL_R, EL_G); the method comprising:

driving the first unit pixel portion (452) using a time division driving method by sequentially providing at least two data signals (DR1-DRn, DG1-DGn, DB1-DBn) to the first unit pixel portion (452) through a first data line in one frame;

characterised in that:

the second unit pixel portion (454) includes a second pixel circuit (501) driving only one organic light emitting diode (EL_B),
and the method further comprises
driving the second unit pixel (454) portion by providing a data signal (DR1-DRn, DG1-DGn, DB1-DBn), other than the at least two data signals (DR1-DRn, DG1-DGn, DB1-DBn) provided to the first unit pixel portion (452), to the second unit pixel portion (454) through a second data line in the one frame.

23. The method according to claim 22, wherein sub-frames are formed by dividing the one frame into predetermined blocks of time.

24. The method according to claim 22 or 23, wherein the at least two organic light emitting diodes (EL_R, EL_G) of the first unit pixel portion (452) do not have a shortest life time among organic light emitting diodes (EL_R, EL_G, EL_B) of the organic light emitting display device (400).

25. A method according to any one of claims 22 to 24, wherein the one organic light emitting diode (EL_B) of the second unit pixel portion (454) has a shortest life time among organic light emitting diodes (EL_R, EL_G, EL_B) of the organic light emitting display device (400).

26. A method according to any one of claims 22 to 25, wherein red and green data signals (DRn, DGn) are sequentially provided to the first data line coupled to the first unit pixel portion (452).

27. A method according to any one of claims 22 to 26, wherein a blue data signal (DBn) is provided to the second data line coupled to the second unit pixel portion (454).

Patentansprüche

1. Organische Licht emittierende Anzeigevorrichtung (400), umfassend:

eine Gate-Ansteuerungsschaltung (430) zur Erzeugung von Abtastsignalen (S1-Sm) und zum Übergeben der Abtastsignale (S1-Sm) an eine Vielzahl von Abtastleitungen;
eine Datenansteuerungsschaltung (420) zum Übergeben von Datensignalen (DR1-DRn, DG1-DGn, DB1-DBn) an eine Vielzahl von Datenleitungen;
eine Emissionssteuerungssignalerzeugungsschaltung (440) zur Erzeugung erster und zweiter Emissionssteuerungssignale (E11-Em1, E12-Em2) und zum Übergeben der ersten und zweiten Emissionssteuerungssignale (E11-Em1, E12-Em2) an eine Vielzahl von Emissionssteuerungsleitungen, um die Emission einer Vielzahl von organischen Licht emittierenden Dioden (EL_R, EL_G, EL_B) zu steuern; und
einen Anzeigebereich (410) mit einer Vielzahl von Pixeln (450), die in einer Matrix angeordnet sind, wobei die Pixel (450) mit der Vielzahl von Abtastleitungen, der Vielzahl von Datenleitungen, der Vielzahl von Emissionssteuerungsleitungen und einer Vielzahl von Netzleitungen zusammengeschaltet sind,
wobei jedes aus der Vielzahl von Pixeln (450)

in einen ersten Einheitspixelabschnitt (452) und einen zweiten Einheitspixelabschnitt (454) unterteilt ist, wobei der erste Einheitspixelabschnitt (452) eine erste Pixelschaltung (500) und zumindest zwei organische Licht emittierende Dioden (EL_R, EL_G) umfaßt,
wobei die zumindest zwei organischen Licht emittierenden Dioden (EL_R, EL_G) des ersten Einheitspixelabschnitts (452) entsprechend angeordnet sind, um unter Verwendung der ersten Pixelschaltung (500) unter Verwendung eines Zeitmultiplexansteuerungsverfahrens angesteuert zu werden,
dadurch gekennzeichnet, dass:

der zweite Einheitspixelabschnitt (454) eine zweite Pixelschaltung (501) umfasst, die mit nur einer organischen Licht emittierenden Diode (EL_B) verbunden ist,
und die organische Licht emittierende Diode (EL_B) des zweiten Einheitspixelabschnitts (454) dafür eingerichtet ist, unter Verwendung der zweiten Pixelschaltung (501) angesteuert zu werden.

2. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 1, wobei das Zeitmultiplexansteuerungsverfahren dafür eingerichtet ist, zumindest zwei Datensignale an den ersten Einheitspixelabschnitt (452) über eine erste Datenleitung in einem Rahmen sequentiell zu übergeben, wobei jeder Rahmen in vorbestimmte Zeitblöcke unterteilt ist, um Teilrahmen zu bilden.

3. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 1 oder 2, wobei die zumindest zwei organischen Licht emittierenden Dioden (EL_R, EL_G) im ersten Einheitspixelabschnitt (452) organische Licht emittierende Dioden umfassen, die nicht die kürzesten Lebensdauern unter den organischen Licht emittierenden Dioden (EL_R EL_G, EL_B) in den Pixeln (450) haben.

4. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 3, wobei die zumindest zwei organischen Licht emittierenden Dioden (EL _R, EL_G) im ersten Einheitspixelabschnitt (452) eine rote organische Licht emittierende Diode (EL_R) und eine grüne organische Licht emittierende Diode (EL_G) umfassen.

5. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der vorhergehenden Ansprüche, wobei die eine organische Licht emittierende Diode (EL_B) im zweiten Einheitspixelabschnitt (454) eine organische Licht emittierende Diode mit der kürzesten Lebensdauer unter den organischen Licht emittierenden Dioden (EL_R, EL_G, EL_B) in den Pixeln (450) umfasst.

6. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 5, wobei die organische Licht emittierende Diode (EL_B) im zweiten Einheitspixelabschnitt (454) eine blaue organische Licht emittierende Diode (EL_B) umfasst.

7. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 2 bis 6, wobei rote und grüne Datensignale (DRn, DGn) in sequentiellen Teilrahmen an Datenleitungen, die mit dem ersten Einheitspixelabschnitt (452) zusammengeschaltet sind, von der Vielzahl von Datenleitungen übergeben werden.

8. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 2 bis 7, wobei ein blaues Datensignal (DBn) in jedem Teilrahmen der einen Rahmenperiode an eine Datenleitung, die mit dem zweiten Einheitspixelabschnitt (454) zusammengeschaltet ist, von der Vielzahl von Datenleitungen übergeben wird.

9. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 2 bis 8,
wobei das erste Emissionssteuerungssignal (El1-Em1) mit einem Tiefpegel in den Teilrahmen bereitgestellt wird und wobei die ersten und zweiten Einheitspixelabschnitte (452, 454) jeweils einen PMOS-Transistor zum Empfangen des ersten Emissionssteuerungssignals (E11-Em1) aufweisen und
wobei die ersten und zweiten Einheitspixelabschnitte (452, 454) dafür eingerichtet sind, als Antwort auf den Tiefpegel des ersten Emissionssteuerungssignals (El1-Em1) Licht in den Teilrahmen zu emittieren.

10. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 2 bis 8,
wobei das erste Emissionssteuerungssignal (El1-Em1) mit einem Hochpegel in den Teilrahmen bereitgestellt wird und wobei die ersten und zweiten Einheitspixelabschnitte (452, 454) jeweils einen NMOS-Transistor zum Empfangen des ersten Emissionssteuerungssignals (E11-Em1) aufweisen und
wobei die ersten und zweiten Einheitspixelabshnitte (452, 454) dafür eingerichtet sind, als Antwort auf den Hochpegel des ersten Emissionssteuerungssignals (El1-Em1) Licht in den Teilrahmen zu emittieren.

11. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 1 bis 10, wobei der erste Einheitspixelabschnitt (452) dafür eingerichtet ist, als Antwort auf das zweite Emissionssteuerungssignal (E12-Em2) mit einem Signalpegel, der in aufeinanderfolgenden Teilrahmen invertiert ist, Lichte mit verschiedenen Farben sequentiell zu emittieren.

12. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 1 bis 11, wobei jede der Pixelschaltungen (500, 501) umfasst;

einen Speicherkondensator (C, C') und einen sechsten Transistor (M6, M6'), die zwischen eine erste Stromversorgung ELVDD und eine Initialisierungsstromversorgung (Vinit) in Reihe geschaltet sind;
einen vierten Transistor (M4, M4'), einen ersten Transistor (M1, M1') und einen fünften Transistor (M5, M5'), die zwischen die erste Stromversorgung (ELVDD) und eine organische Licht emittierende Diode (EL_R, EL_G, EL_B) in Reihe geschaltet sind;
einen dritten Transistor (M3, M3'), der zwischen eine Gate-Elektrode und eine erste Elektrode des ersten Transistors (M1, M1') geschaltet ist; und
einen zweiten Transistor (M2, M2'), der zwischen eine aus der Vielzahl der Datenleitungen und eine zweite Elektrode des ersten Transistors (M1, M1') geschaltet ist.

13. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 12, wobei der erste (M1, M1'), zweite (M2, M2'), dritte (M3, M3'), vierte (M4, M4'), fünfte (M5, M5') und sechste (M6, M6') Transistor PMOS-Transistoren sind.

14. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 12 oder 13, wobei der erste Einheitspixelabschnitt (452) ferner einen siebenten Transistor (M7) und einen achten Transistor (M8) umfasst, wobei der siebente (M7) und der achte Transistor (M8) jeweils zwischen rote (EL_R) und grüne (EL_G) organische Licht emittierende Dioden und den fünften Transistor (M5) geschaltet sind.

15. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 14, wobei der siebente Transistor (M7) ein PMOS-Transistor und der achte Transistor (M8) ein NMOS-Transistor ist.

16. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 14 oder 15, wobei die zweite Emissionssteuerungsleitung (E12-Em2) von der Vielzahl von Emissionssteuerungsleitungen mit einer Gate-Elektrode des siebenten Transistors (M7) und einer Gate-Elektrode des achten Transistors (M8) zusammengeschaltet ist und das zweite Emissionssteuerungssignal dafür eingerichtet ist, an die zweite Emissionssteuerungsleitung zum sequentiellen Ansteuern der roten und grünen organischen Licht emittierenden Dioden (EL_R, EL_G) des ersten Einheitspixelabschnitts (452) sequentiell übergeben zu werden.

17. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 1,
wobei der erste Einheitspixelabschnitt (452) eine erste Pixelschaltung (500) umfasst, die zumindest zwei der organischen Licht emittierenden Dioden (EL_R, EL_G) unter sich teilen, und
wobei der zweite Einheitspixelabschnitt (454) eine der organischen Licht emittierenden Dioden (EL_B) mit der kürzesten Lebensdauer unter den organischen Licht emittierenden Dioden (EL_R EL_G, EL_B) umfasst.

18. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 1 bis 8 oder 17, wobei das erste Emissionssteuerungssignal (E11-Em1) in einer Teilrahmenperiode als ein Signal mit Tief- oder Hochpegel bereitgestellt wird.

19. Organische Licht emittierende Anzeigevorrichtung (400) nach Anspruch 18,
wobei die ersten und zweiten Einheitspixelabschnitte (452, 454) jeweils einen NMOS-Transistor oder einen PMOS-Transistor zum Empfangen des ersten Emissionssteuerungssignals (E11, Em1) aufweisen;
wobei das erste Emissionssteuerungssignal (El1-Em1) mit einem Tiefpegel dafür eingerichtet ist, bereitgestellt zu werden, wenn der Einheitspixelabschnitt einen PMOS-Transistor umfasst, und
wobei das erste Emissionssteuerungssignal (El1-Em1) mit dem Hochpegel dafür eingerichtet ist, bereitgestellt zu werden, wenn der Einheitspixelabschnitt einen NMOS-Transistor aufweist.

20. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 1 bis 19,
wobei der erste Einheitspixelabschnitt (452) dafür eingerichtet ist, als Antwort auf das zweite Emissionssteuerungssignal (E12-Em2) Licht in Teilrahmen sequentiell zu emittieren, und
wobei ein Signalpegel des zweiten Emissionssteuerungssignals (E12-Em2) in aufeinanderfolgenden Teilrahmen invertiert wird.

21. Organische Licht emittierende Anzeigevorrichtung (400) nach einem der Ansprüche 17 bis 20, wobei der erste Einheitspixelabschnitt (452) ferner eine Vielzahl von Transistoren umfasst, die jeweils zwischen die erste Pixelschaltung (500) und die zumindest zwei der organischen Licht emittierenden Dioden (EL_R, EL_G) geschaltet ist, wobei die Vielzahl von Transistoren dafür eingerichtet ist, das zweite Emissionssteuenungssignal (E12, Em2) zu empfangen.

22. Verfahren zur Ansteuerung einer organischen Licht emittierenden Anzeigevorrichtung (400) mit einem Pixel (450) mit ersten und zweiten Einheitspixelabschnitten (452, 454), wobei der erste Einheitspixelabschnitt (452) eine erste Pixelschaltung (500) aufweist, die sich zumindest zwei organische Licht emittierende Dioden (EL_R, EL_G) teilen, wobei das Verfahren umfasst.

Ansteuern des ersten Einheitspixelabschnitts (452) unter Verwendung eines Zeitmultiplexansteuerungsverfahrens durch sequentielles Übergeben von zumindest zwei Datensignalen (DR1-DRn, DG1-DGn, DB1-DBn) an den ersten Einheitspixelabschnitt (452) über eine erste Datenleitung in einem Rahmen;

dadurch gekennzeichnet, dass:

der zweite Einheitspixelabschnitt (454) eine zweite Pixelschaltung (501) aufweist, die nur eine organische Licht emittierende Diode (EL_B) ansteuert; und

das Verfahren ferner umfasst:

Ansteuern des zweiten Einheitspixelabschnitts (454) durch Übergeben eines Datensignals (DR1-DRn, DG1-DGn, DB1-DBn) außer den zumindest zwei Datensignalen (DR1-DRn, DG1-DGn, DB1-DBn), die an den ersten Einheitspixelabschnitt (452) übergeben werden, an den zweiten Einheitspixelabschnitt (454) über eine zweite Datenleitung in dem einen Rahmen.

23. Verfahren nach Anspruch 22, wobei Teilrahmen gebildet werden, indem der eine Rahmen in vorbestimmte Zeitblöcke geteilt wird.

24. Verfahren nach Anspruch 22 oder 23, wobei die zumindest zwei organischen Licht emittierenden Dioden (EL_R, EL_G) des ersten Einheitspixelabschnitts (452) nicht eine kürzeste Lebensdauer unter organischen Licht emittierenden Dioden (EL_R, EL_G, EL_B) der organischen Licht emittierenden Anzeigevorrichtung (400) haben.

25. Verfahren nach einem der Ansprüche 22 bis 24, wobei die eine organische Licht emittierende Diode (EL_B) des zweiten Einheitspixelabschnitts (454) eine kürzeste Lebensdauer unter organischen Licht emittierenden Dioden (EL_R, EL_G, EL_B) der organischen Licht emittierenden Anzeigevorrichtung (400) hat.

26. Verfahren nach einem der Ansprüche 22 bis 25, wobei rote und grüne Datensignale (DRn, DGn) an die erste Datenleitung, die mit dem ersten Einheitspixelabschnitt (452) zusammengeschaltet ist, sequentiell übergeben werden.

27. Verfahren nach einem der Ansprüche 22 bis 26, wobei ein blaues Datensignal (DBn) an die zweite Leitung, die mit dem zweiten Einheitspixelabschnitt (454) zusammengeschaltet ist, übergeben wird.

Revendications

1. Dispositif d'affichage électroluminescent organique (400) comprenant:

un circuit de commande de grille (430) pour générer des signaux de balayage (S1 à Sm) et fournir les signaux de balayage (S1 à Sm) à une pluralité de lignes de balayage ;

un circuit de commande de données (420) pour fournir des signaux de données (DR1-DRn, DG1-DGn, DB1-DBn) à une pluralité de lignes de données ;

un circuit de génération de signal de commande d'émission (440) pour générer des premier et deuxième signaux de commande d'émission (E11-Em1, E12-Em2) et pour fournir les premier et deuxième signaux de commande d'émission (E11-Em1, E12-Em2) à une pluralité de lignes de commande d'émission pour commandeur l'émission d'une pluralité de diodes électroluminescentes organiques (EL_R, EL_G, EL_B) ; et

une région d'affichage (410) comprenant une pluralité de pixels (450) agencés en une matrice, les pixels (450) étant couplés à la pluralité de lignes de balayage, à la pluralité de lignes de données, à la pluralité de lignes de commande d'émission, et à une pluralité de lignes de puissance,

dans lequel chacun de la pluralité de pixels (450) est divisé en une première partie de pixel unitaire (452) et une deuxième partie de pixel unitaire (454), la première partie de pixel unitaire (452) comprenant un premier circuit de pixel (500) et au moins deux diodes électroluminescentes organiques (EL_R EL_G),

dans lequel lesdites au moins deux diodes électroluminescentes organiques (EL_R, EL_G) de la première partie de pixel unitaire (452) sont agencées pour être commandées en utilisant le premier circuit de pixel (500) en utilisant un procédé de commande par répartition dans le temps,

caractérisé en ce que :

la deuxième partie de pixel unitaire (454) comprend un deuxième circuit de pixel (501) connecté à une seule diode électroluminescente organique (EL_B), et

la diode électroluminescente organique (EL_B) de la deuxième partie de pixel unitaire (454) est agencée pour être commandée en utilisant le deuxième circuit de pixel (501).

2. Dispositif d'affichage électroluminescent organique (400) selon la revendication 1, dans lequel le procédé de commande par répartition dans le temps est agencé pour fournir séquentiellement au moins deux signaux de données à la première partie de pixel unitaire (452) par l'intermédiaire d'une première ligne de données dans une trame, chaque trame étant divisé en blocs de temps prédéterminés pour former des sous-trames.

3. Dispositif d'affichage électroluminescent organique (400) selon la revendication 1 ou 2, dans lequel lesdites au moins deux diodes électroluminescentes organiques (EL_R, EL_G) dans la première partie de pixel unitaire (452) comprennent des diodes électroluminescentes organiques n'ayant pas les temps de vie les plus courts parmi les diodes électroluminescentes organiques (EL_R, EL_G, EL_B) dans les pixels (450).

4. Dispositif d'affichage électroluminescent organique (400) selon la revendication 3, dans lequel lesdites au moins deux diodes électroluminescentes organiques (EL_R, EL_G) dans la première partie de pixel unitaire (452) comprennent une diode électroluminescente organique rouge (EL_R) et une diode électroluminescente organique verte (EL_G).

5. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications précédentes, dans lequel ladite une diode électroluminescente organique (EL_B) dans la deuxième partie de pixel unitaire (454) comprend une diode électroluminescente organique ayant le temps de vie le plus court parmi les diodes électroluminescentes organiques (EL_R, EL_G, EL_B) dans les pixels (450).

6. Dispositif d'affichage électroluminescent organique (400) selon la revendication 5, dans lequel ladite une diode électroluminescente organique (EL_B) dans la deuxième partie de pixel unitaire (454) comprend une diode électroluminescente organique bleue (EL_B).

7. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 2 à 6, dans lequel des signaux de données rouge et vert (DRn, DGn) sont fournis dans des sous-trames séquentielles à des lignes de données couplées à la première partie de pixel unitaire (452) parmi la pluralité de lignes de données.

8. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 2 à 7, dans lequel un signal de données bleu (DBn) est fourni dans chaque sous-trame d'une période de trame à une ligne de données couplée à la deuxième partie de pixel unitaire (454) parmi la pluralité de lignes de données.

9. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 2 à 8,
dans lequel le premier signal de commande d'émission (E11 à Em1) d'un niveau bas est fourni dans les sous-trames, et dans lequel les première et deuxième parties de pixel unitaires (452, 454) comprennent chacune un transistor PROS pour recevoir le premier signal de commande d'émission (E11-Em1), et
dans lequel les première et deuxième parties de pixel unitaires (452, 454) sont agencées pour émettre une lumière dans les sous-trames en réponse au niveau bas du premier signal de commande d'émission (E11-Em1).

10. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 2 à 8,
dans lequel le premier signal de commande d'émission (E11-Em1) d'un niveau haut est fourni dans les sous-trames, et dans lequel les première et deuxième parties de pixel unitaires (452, 454) comprennent chacune un transistor NMOS pour recevoir le premier signal de commande d'émission (E11-Em1), et dans lequel les première et deuxième parties de pixel unitaires (452, 454) sont agencées pour émettre une lumière dans les sous-trames en réponse au niveau haut du premier signal de commande d'émission (E11-Em1).

11. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 1 à 10, dans lequel la première partie de pixel unitaire (452) est agencée pour émettre séquentiellement des lumières ayant différentes couleurs en réponse au deuxième signal de commande d'émission (E12-Em2) ayant un niveau de signal inversé dans des sous-trames consécutives.

12. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 1 à 11, dans lequel chacun des circuits de pixel (500, 501) comprend :

un condensateur de stockage (C, C') et un sixième transistor (M6, M6') couplés en série entre une première alimentation ELVDD et une alimentation d'initialisation (Vinit) ;
un quatrième transistor (M4, M4'), un premier transistor (M1, M1'), et un cinquième transistor (M5, M5') couplés en série entre la première ali-

mentation (ELVDD) et une diode électroluminescente organique (EL_R, EL_G, EL_B) ;
un troisième transistor (M3, M3') couplé entre une électrode de grille et une première électrode du premier transistor (M1, M1') ; et
un deuxième transistor (M2, M2') couplé entre l'une de la pluralité de lignes de données et une deuxième électrode du premier transistor (M1, M1').

13. Dispositif d'affichage électroluminescent organique (400) selon la revendication 12, dans lequel les premier (M1, M1'), deuxième (M2, M2'), troisième (M3, M3'), quatrième (M4, M4'), cinquième (M5, M5') et sixième (M6, M6') transistors sont des transistors PMOS.

14. Dispositif d'affichage électroluminescent organique (400) selon la revendication 12 ou 13, dans lequel la première partie de pixel unitaire (452) comprend en outre un septième transistor (M7) et un huitième transistor (M8), les septième (M7) et huitième (M8) transistors étant respectivement couplés entre les diodes électroluminescentes organiques rouge (EL_R) et verte (EL_G) et le cinquième transistor (M5).

15. Dispositif d'affichage électroluminescent organique selon la revendication 14, dans lequel le septième transistor (M7) est un transistor PMOS, et le huitième transistor (M8) est un transistor NMOS.

16. Dispositif d'affichage électroluminescent organique (400) selon la revendication 14 ou 15, dans lequel une deuxième ligne de commande d'émission (E12-Em2) parmi la pluralité de lignes de commande d'émission est couplée à une électrode de grille du septième transistor (M7) et à une électrode de grille du huitième transistor (M8), et le deuxième signal de commande d'émission est agencé pour être fourni à la deuxième ligne de commande d'émission pour commander séquentiellement les diodes électroluminescentes organiques rouge et verte (EL_R, EL_G) de la première partie de pixel unitaire (452).

17. Dispositif d'affichage électroluminescent organique (400) selon la revendication 1,
dans lequel la première partie de pixel unitaire (452) comprend un premier circuit de pixel (500) partagé entre au moins deux des diodes électroluminescentes organiques (EL_R, EL_G), et
dans lequel la deuxième partie de pixel unitaire (454) comprend une des diodes électroluminescentes organiques (EL_B) ayant un temps de vie le plus court parmi les diodes électroluminescentes organiques (EL_R, EL_G, EL_B).

18. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 1 à 8 ou 17, dans lequel le premier signal de commande d'émission (E11-Em1) est fourni dans une période de sous-trame en tant que signal ayant un niveau bas ou haut.

19. Dispositif d'affichage électroluminescent organique (400) selon la revendication 18,
dans lequel les première et deuxième parties de pixel unitaires (452, 454) comprennent chacune un transistor NMOS ou un transistor PMOS pour recevoir le premier signal de commande d'émission (E11-Em1);
dans lequel le premier signal de commande d'émission (E11-Em1) d'un niveau bas est agencé pour être fourni lorsque la partie de pixel unitaire comprend un transistor PMOS, et
dans lequel le premier signal de commende d'émission (E11-Em1) du niveau haut est agencé pour être fourni lorsque la partie de pixel unitaire comprend un transistor NMOS.

20. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 1 à 19,
dans lequel la première partie de pixel unitaire (452) est agencée pour émettre séquentiellement une lumière dans des sous-trames en réponse au deuxième signal de commande d'émission (E12-Em2), et dans lequel un niveau de signal du deuxième signal de commande d'émission (E12-Em2) est inversé dans des sous-trames consécutives.

21. Dispositif d'affichage électroluminescent organique (400) selon l'une quelconque des revendications 17 à 20, dans lequel la première partie de pixel unitaire (452) comprend en outre une pluralité de transistors couplés respectivement entre le premier circuit de pixel (500) et lesdites au moins deux diodes électroluminescentes organiques (EL_R, EL_G), la pluralité de transistors étant agencés pour recevoir le deuxième signal de commande d'émission (E12-Em2).

22. Procédé pour commander un dispositif d'affichage électroluminescent organique (400) comprenant un pixel (450) comportant des première et deuxième parties de pixel unitaires (452, 454), la première partie de pixel unitaire (452) comprenant un premier circuit de pixel (500) partagé par au moines deux diodes électroluminescentes organiques (EL_R, EL_G) ;
le procédé consistant à :

> commander la première partie de pixel unitaire (452) en utilisant un procédé de commande par répartition dans le temps en fournissant séquentiellement au moins deux signaux de données (DR1-DRn, DG1-DGn, DB1-DBn) à la première

partie de pixel unitaire (452) par l'intermédiaire d'une première ligne de données dans une trame ;

caractérisé en ce que :

la deuxième partie de pixel unitaire (454) comprend un deuxième circuit de pixel (501) commandant une seule diode électroluminescente organique (EL_B), et le procédé consistant en outre à :

commander la deuxième partie de pixel unitaire (454) en fournissant un signal de données (DR1-DRn, DG1-DGn, DB1-DAn), autre que lesdits au moins deux signaux de données (DR1-DRn, DG1-DGn, DB1-DBn) fournis à la première partie de pixel unitaire (452), à la deuxième partie de pixel unitaire (454) par l'intermédiaire d'une deuxième ligne de données dans ladite une trame.

23. Procédé selon la revendication 22, dans lequel des sous-trames sont formées en divisant ladite une trame en des blocs de temps prédéterminés.

24. Procédé selon la revendication 22 ou 23, dans lequel lesdites au moins deux diodes électroluminescentes organiques (EL_R, EL_G) de la première partie de pixel unitaire (452) n'ont pas un temps de vie le plus court parmi les diodes électroluminescentes organiques (EL_R, EL_G, EL_B) du dispositif d'affichage électroluminescent organique (400).

25. Procédé selon l'une quelconque des revendications 22 à 24, dans lequel ladite une diode électroluminescente organique (EL_B) de la deuxième partie de pixel unitaire (454) a un temps de vie le plus court parmi les diodes électroluminescentes organiques (EL_R, EL_G, EL_B) du dispositif d'affichage électroluminescent organique (400),

26. Procédé selon l'une quelconque des revendications 22 à 25, dans lequel des signaux de données rouge et vert (DRn, DGn) sont fournis séquentiellement à la première ligne de données couplée à la première partie de pixel unitaire (452).

27. Procédé selon l'une quelconque des revendications 22 à 26, dans lequel un signal de données bleu (DBn) est fourni à la deuxième ligne de données couplée à la deuxième partie de pixel unitaire (454).

FIG. 1
(PRIOR ART)

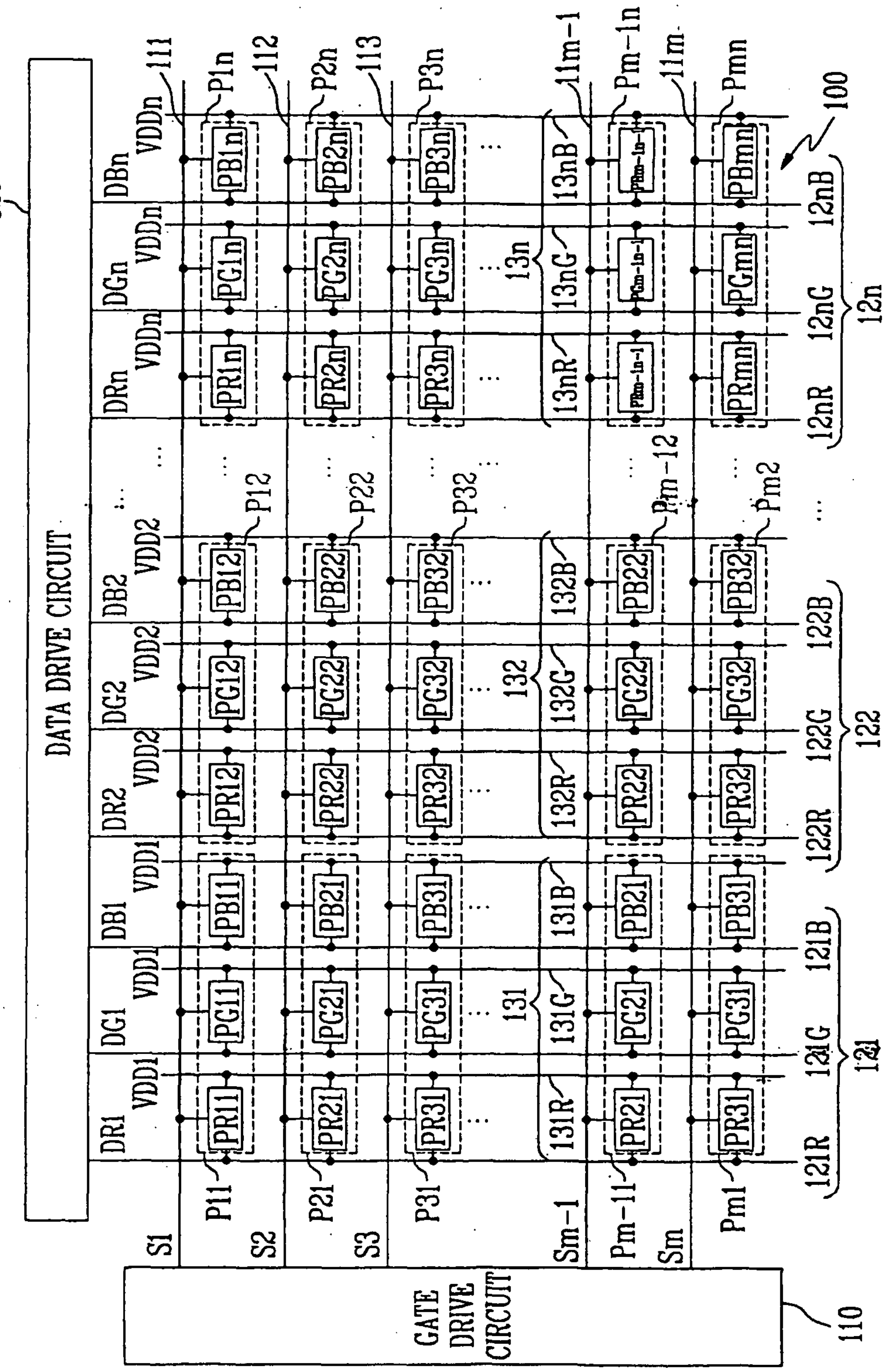


FIG. 2
(PRIOR ART)

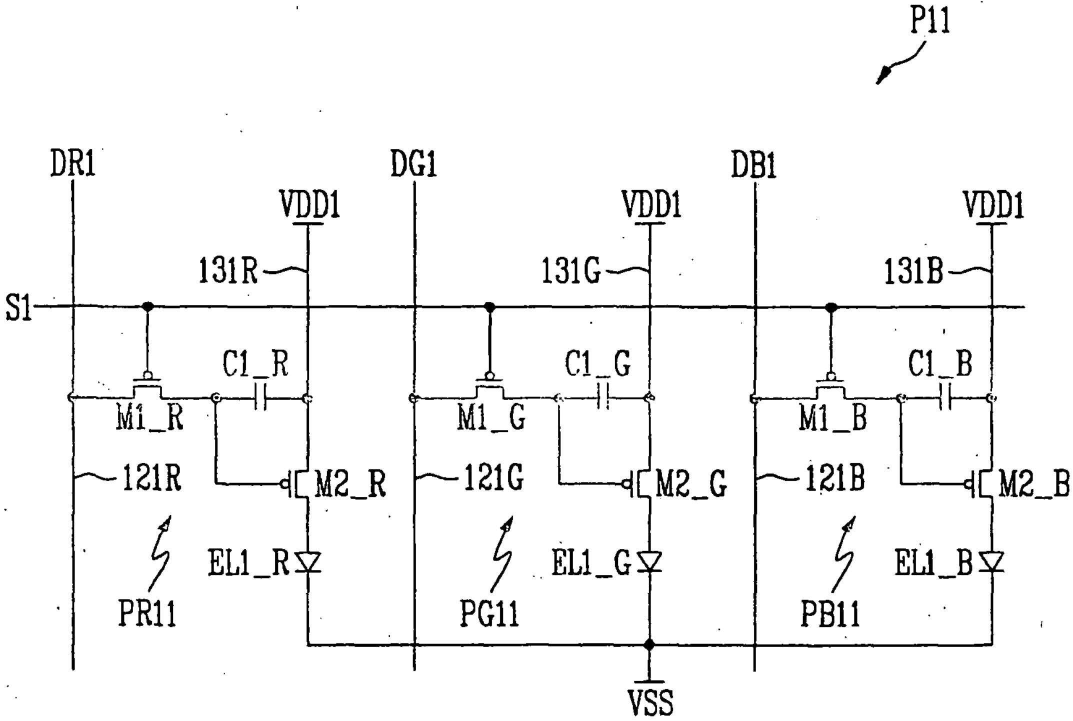


FIG. 3

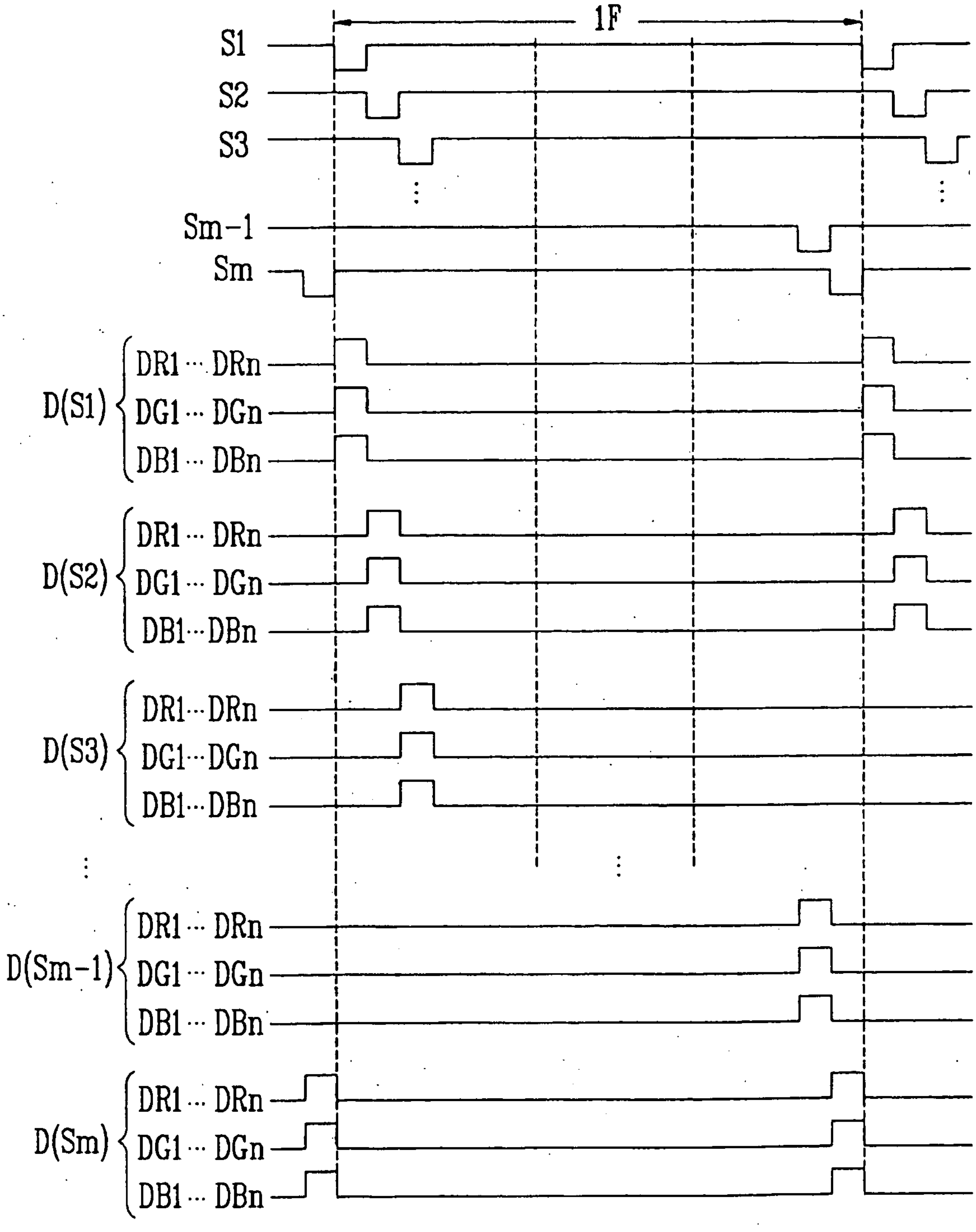

1F
S1
S2
S3
Sm-1
Sm
D(S1)
DR1 ··· DRn
DG1 ··· DGn
DB1 ··· DBn
D(S2)
DR1 ··· DRn
DG1 ··· DGn
DB1···DBn
D(S3)
DR1···DRn
DG1···DGn
DB1···DBn
D(Sm-1)
DR1 ··· DRn
DG1 ··· DGn
DB1 ··· DBn
D(Sm)
DR1 ··· DRn
DG1 ··· DGn
DB1 ··· DBn

FIG. 4

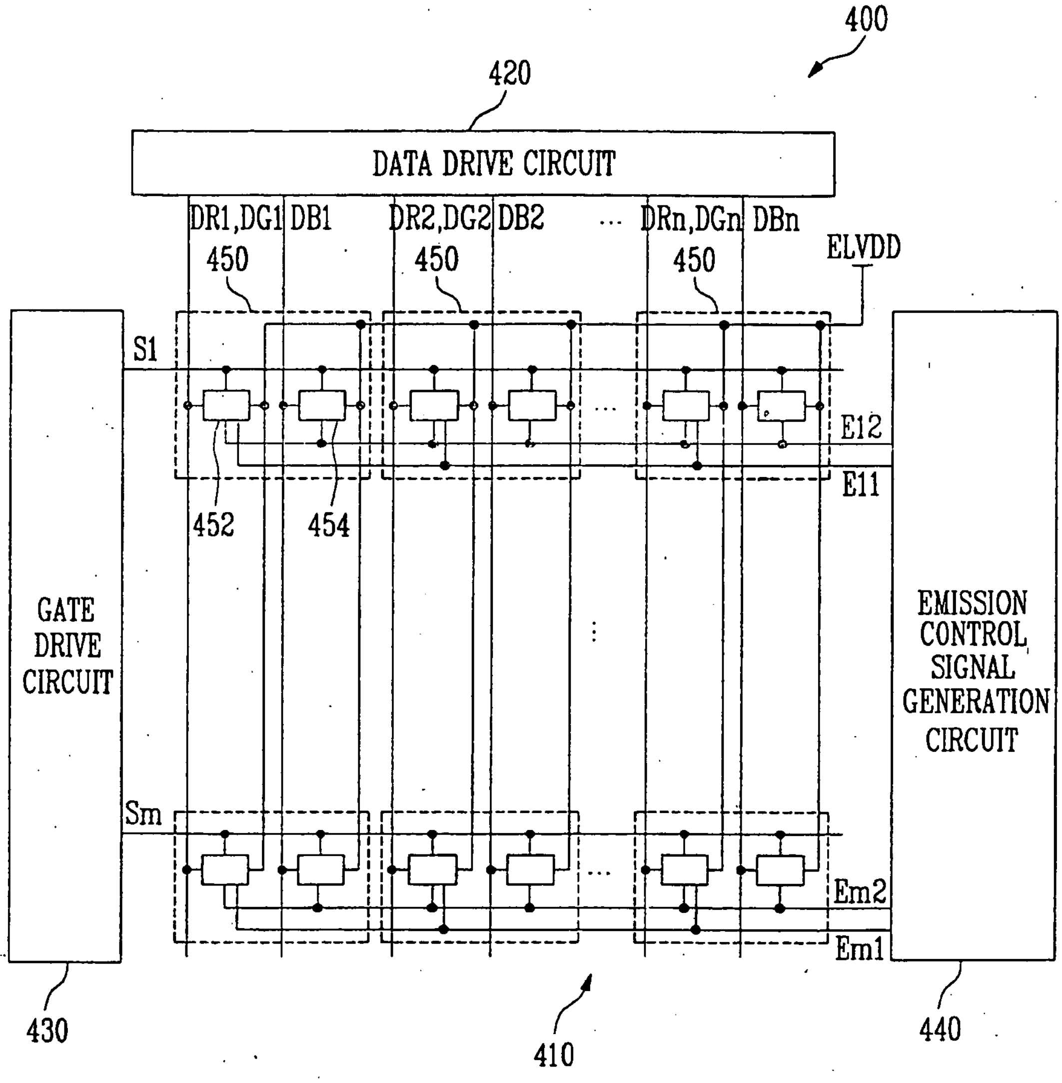

400
420
DATA DRIVE CIRCUIT
DR1,DG1
DB1
DR2,DG2
DB2
DRn,DGn
DBn
ELVDD
450
450
450
S1
E12
E11
452
454
GATE DRIVE CIRCUIT
EMISSION CONTROL SIGNAL GENERATION CIRCUIT
Sm
Em2
Em1
430
410
440

FIG. 5

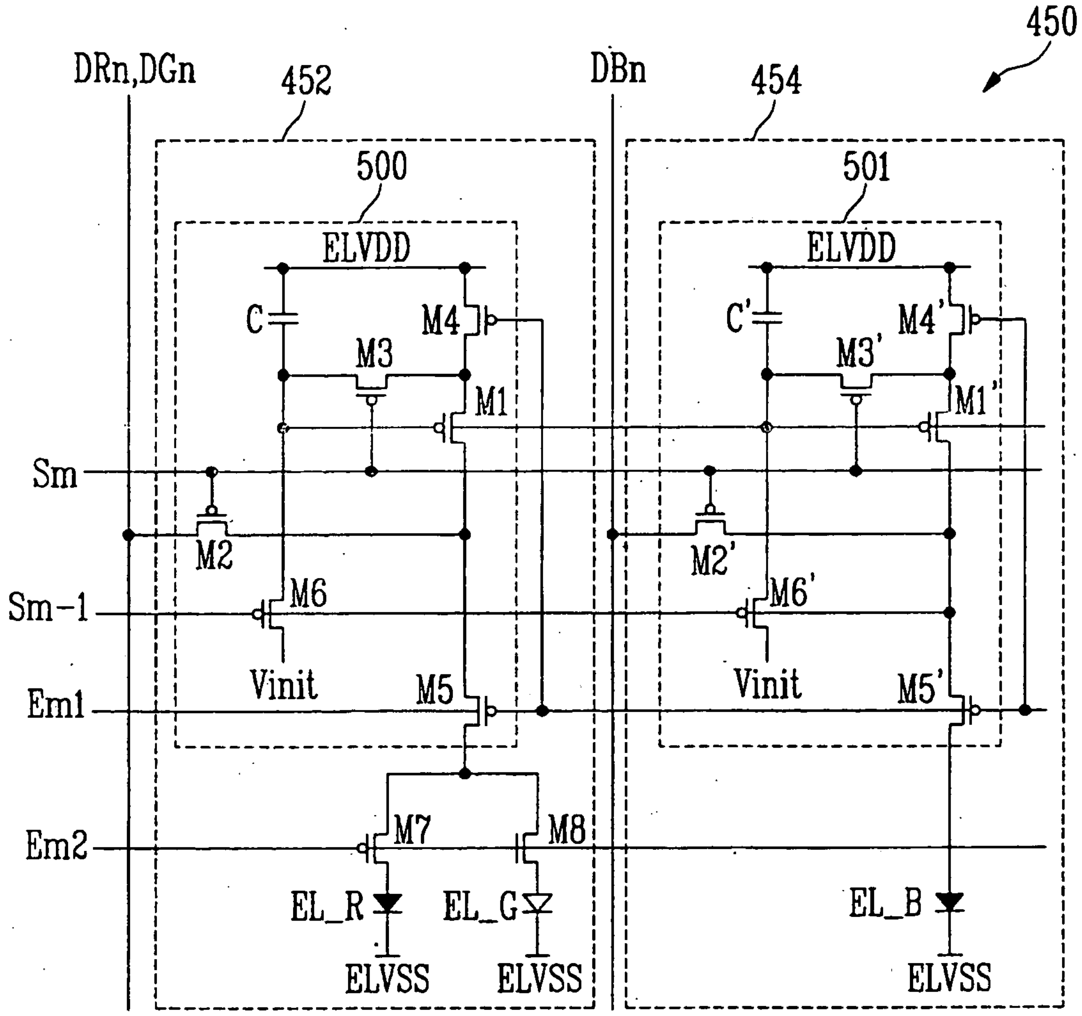
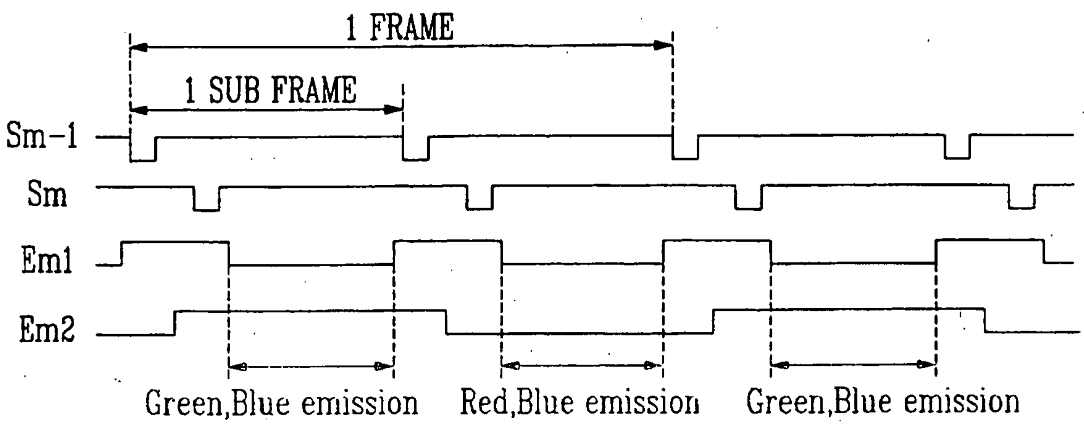

450
DRn,DGn
452
DBn
454
500
501
ELVDD
ELVDD
C
M4
M3
M1
C'
M4'
M3'
M1'
Sm
M2
M2'
Sm-1
M6
M6'
Vinit
Vinit
Em1
M5
M5'
Em2
M7
M8
EL_R
EL_G
EL_B
ELVSS
ELVSS
ELVSS

FIG. 6


1 FRAME
1 SUB FRAME
Sm-1
Sm
Em1
Em2
Green,Blue emission
Red,Blue emission
Green,Blue emission

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1536406 A **[0028]**
- EP 1496495 A **[0029]**
- US 2005200573 A **[0030]**

专利名称(译)	有机发光显示装置及其驱动方法		
公开(公告)号	[EP1783738B1](EP1783738B1)	公开(公告)日	2009-09-16
申请号	EP2006255680	申请日	2006-11-03
[标]申请(专利权)人(译)	三星斯笛爱股份有限公司		
申请(专利权)人(译)	三星SDI CO.，LTD.		
当前申请(专利权)人(译)	三星移动显示器有限公司.		
发明人	KWAK, WON KYU C/O SAMSUNG SDI CO., LTD. NAOAKI, KOMIYA C/O SAMSUNG SDI CO., LTD.		
IPC分类号	G09G3/32		
优先权	1020050105699 2005-11-04 KR		
其他公开文献	EP1783738A2 EP1783738A3		
外部链接	Espacenet		

摘要(译)

有机发光二极管（OLED）显示装置和使用时分控制驱动方法的驱动方法，用于具有相对较长寿命的OLED，以及用于具有相对较短寿命的OLED的一般驱动方法。栅极驱动电路在子帧中提供扫描信号以扫描线。数据驱动电路向数据线提供数据信号。发射控制信号产生电路提供第一和第二发射控制信号以控制OLED。显示区域包括以矩阵排列并连接到扫描线，数据线，发射控制线和电源线的像素。像素包括第一和第二单位像素部分。第一单位像素部分通过一个共用像素电路驱动多个有机发光二极管来执行时分控制驱动。在第二单元部分中，一个有机发光二极管由独立的像素电路驱动。