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(54) **ORGANIC LIGHT EMITTING DISPLAY AND METHOD OF DRIVING THE SAME**

(75) Inventor: **Oh-Kyong KWON**, Seoul (KR)

Correspondence Address:
STEIN MCEWEN, LLP
1400 EYE STREET, NW, SUITE 300
WASHINGTON, DC 20005 (US)

(73) Assignees: **Samsung SDI Co., Ltd.**, Suwon-si (KR); **IUCF-HYU**, Seongdong-gu (KR)

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(57) **ABSTRACT**

There is provided an organic light emitting display capable of compensating for the deterioration of organic light emitting diodes (OLED) while sharing an analog-to-digital converter (ADC). The organic light emitting display includes sub pixels positioned in the intersections between scan lines and data lines, a current source unit for supplying predetermined current to organic light emitting diodes (OLED) in a sensing period for grasping deterioration information on the OLEDs included in the sub pixels, at least one analog-to-digital converter (ADC) provided fewer than data lines in order to convert a voltage applied to the OLEDs into a digital signal, and a switching unit for coupling the data lines to the current source unit in the sensing period and for sequentially coupling at least one ADC to the data lines in the sensing period.

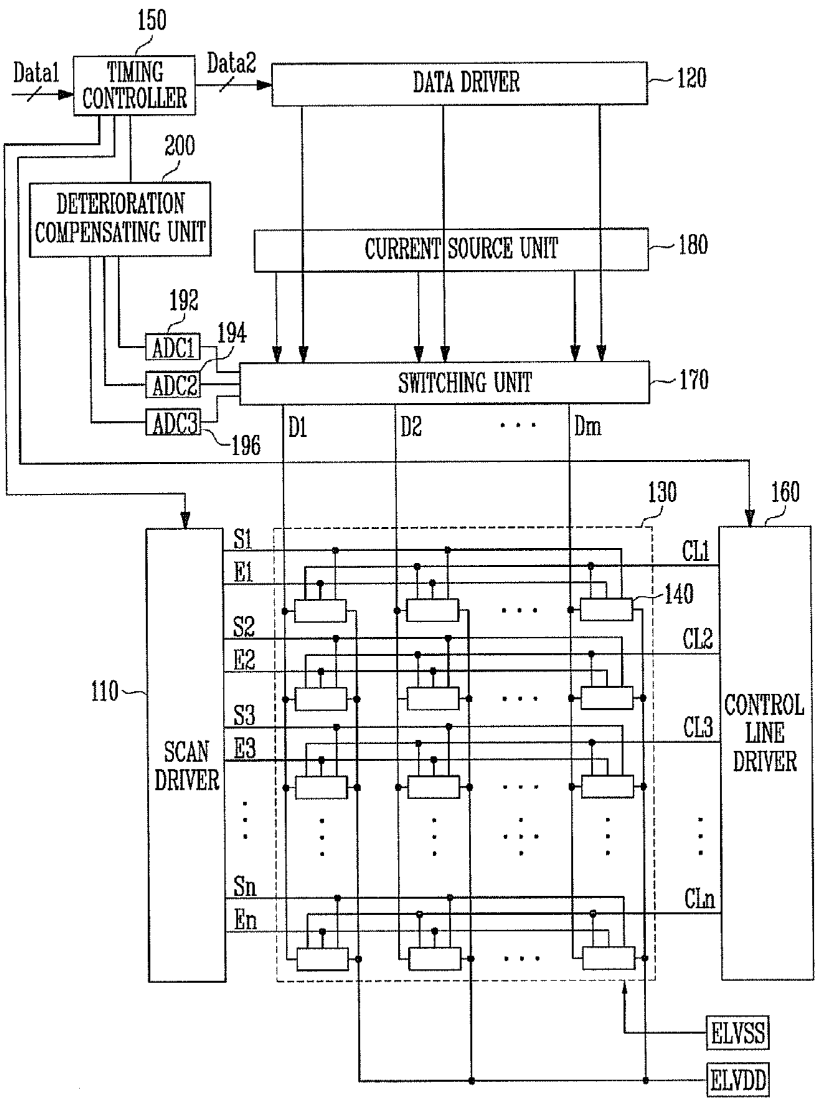


FIG. 1

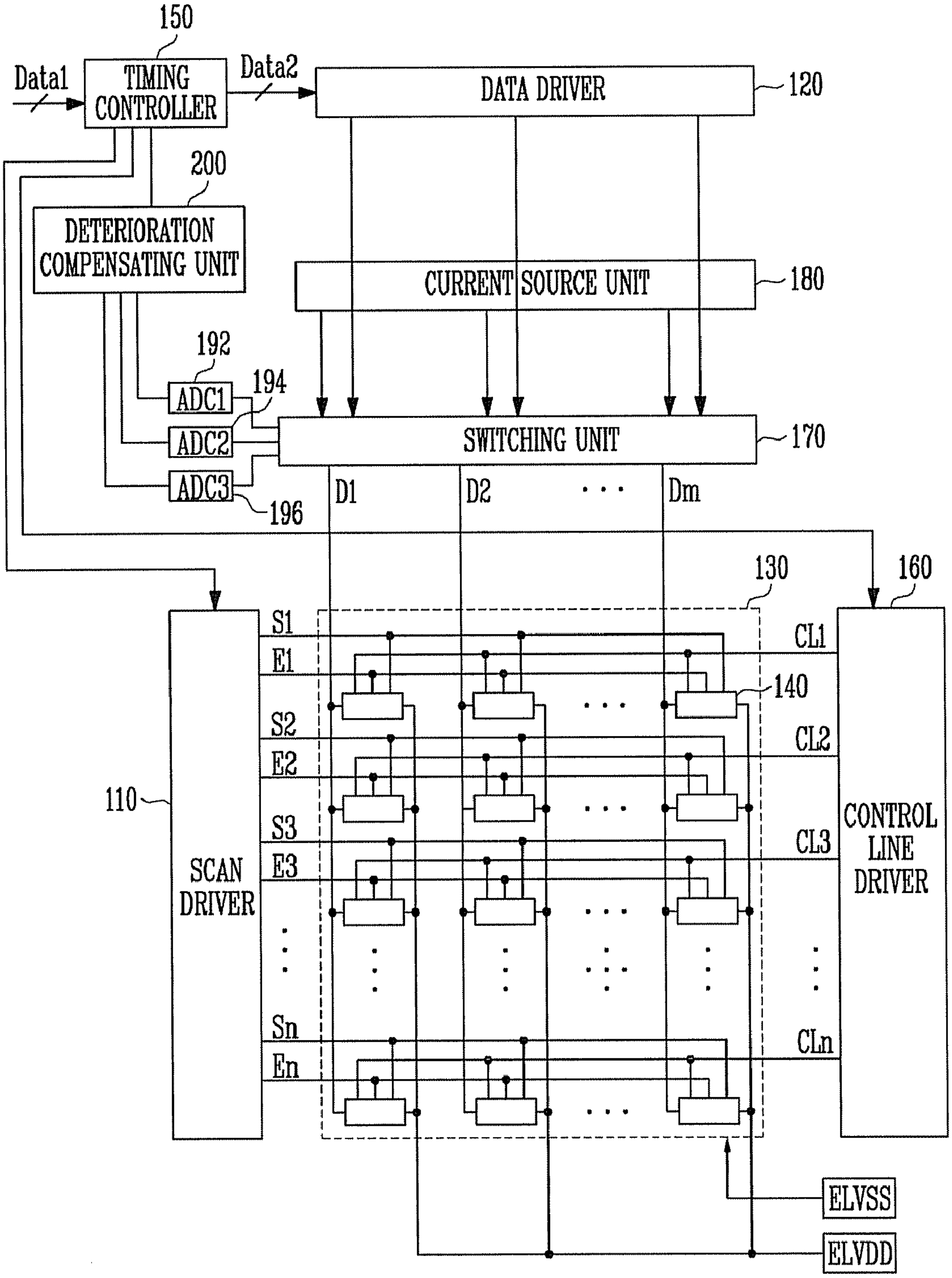

150
Data1
TIMING CONTROLLER
Data2
DATA DRIVER
120
200
DETERIORATION COMPENSATING UNIT
CURRENT SOURCE UNIT
180
192
ADC1
194
ADC2
ADC3
196
SWITCHING UNIT
170
D1
D2
Dm
130
160
S1
E1
CL1
140
S2
E2
CL2
S3
E3
CL3
110
SCAN DRIVER
CONTROL LINE DRIVER
Sn
En
CLn
ELVSS
ELVDD

FIG. 2

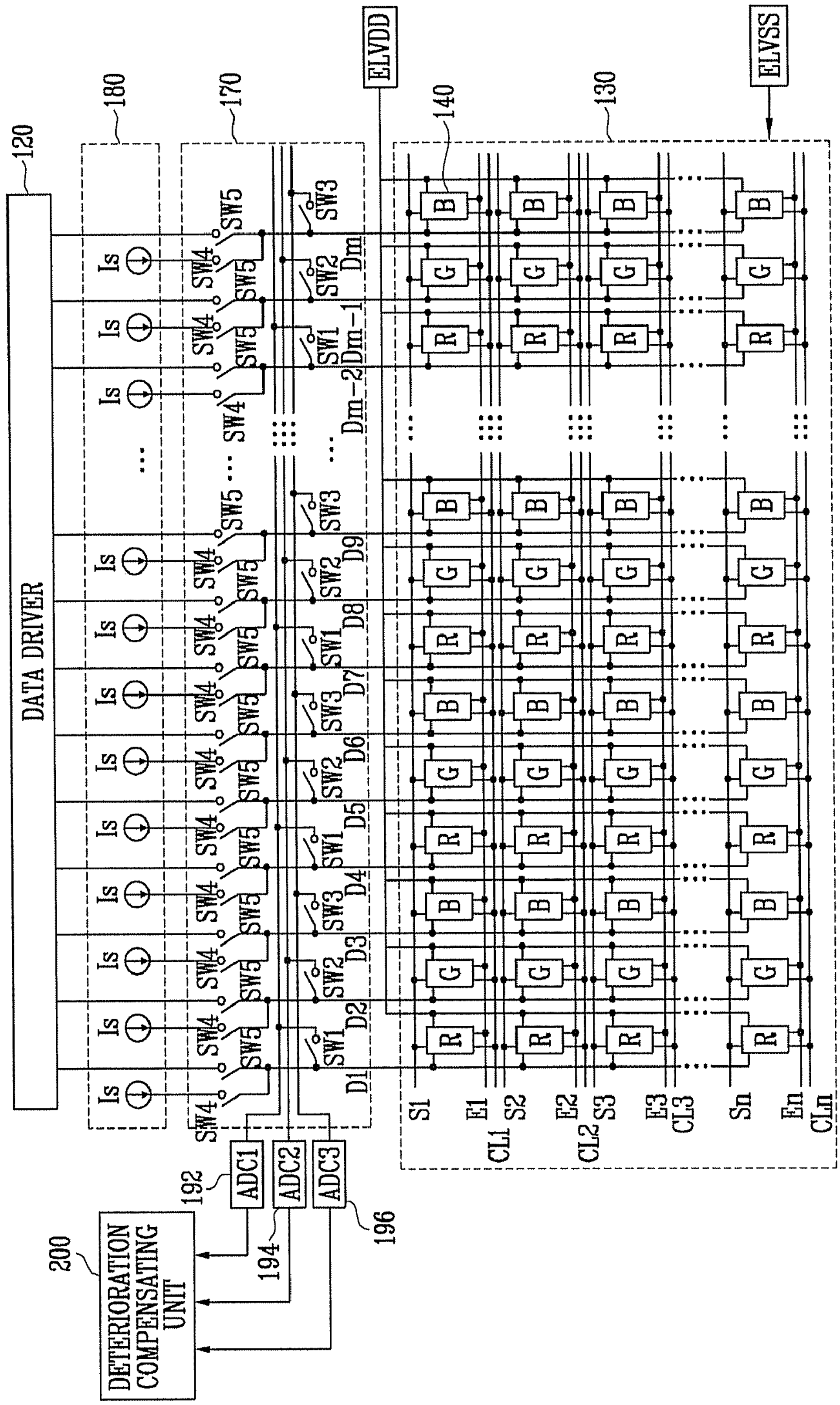

120
DATA DRIVER
180
Is
170
SW1
SW2
SW3
SW4
SW5
D1
D2
D3
D4
D5
D6
D7
D8
D9
Dm-2
Dm-1
Dm
ELVDD
ELVSS
140
130
R
G
B
S1
E1
CL1
S2
E2
CL2
S3
E3
CL3
Sn
En
CLn
ADC1
ADC2
ADC3
192
194
196
200
DETERIORATION COMPENSATING UNIT

FIG. 3

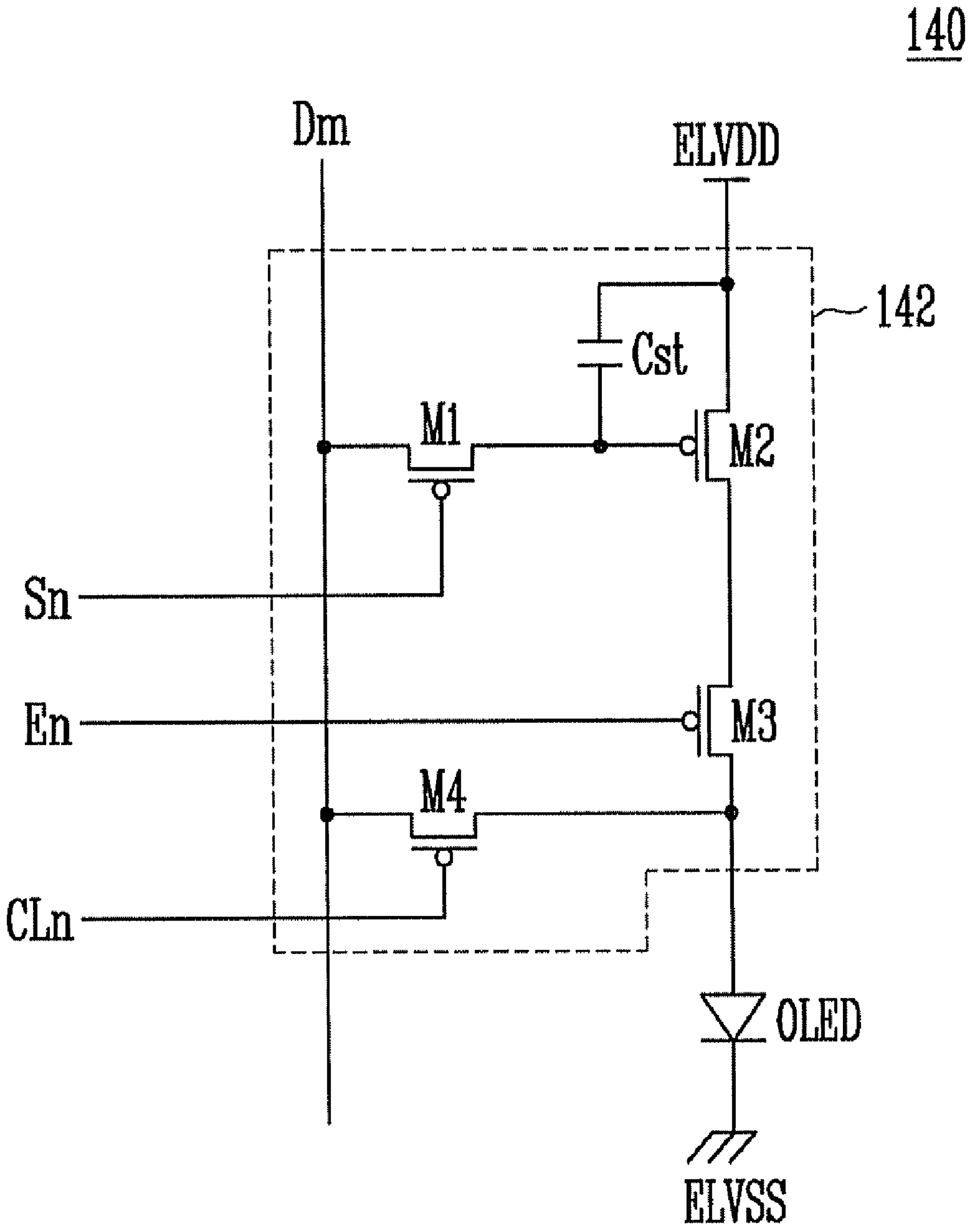


FIG. 4

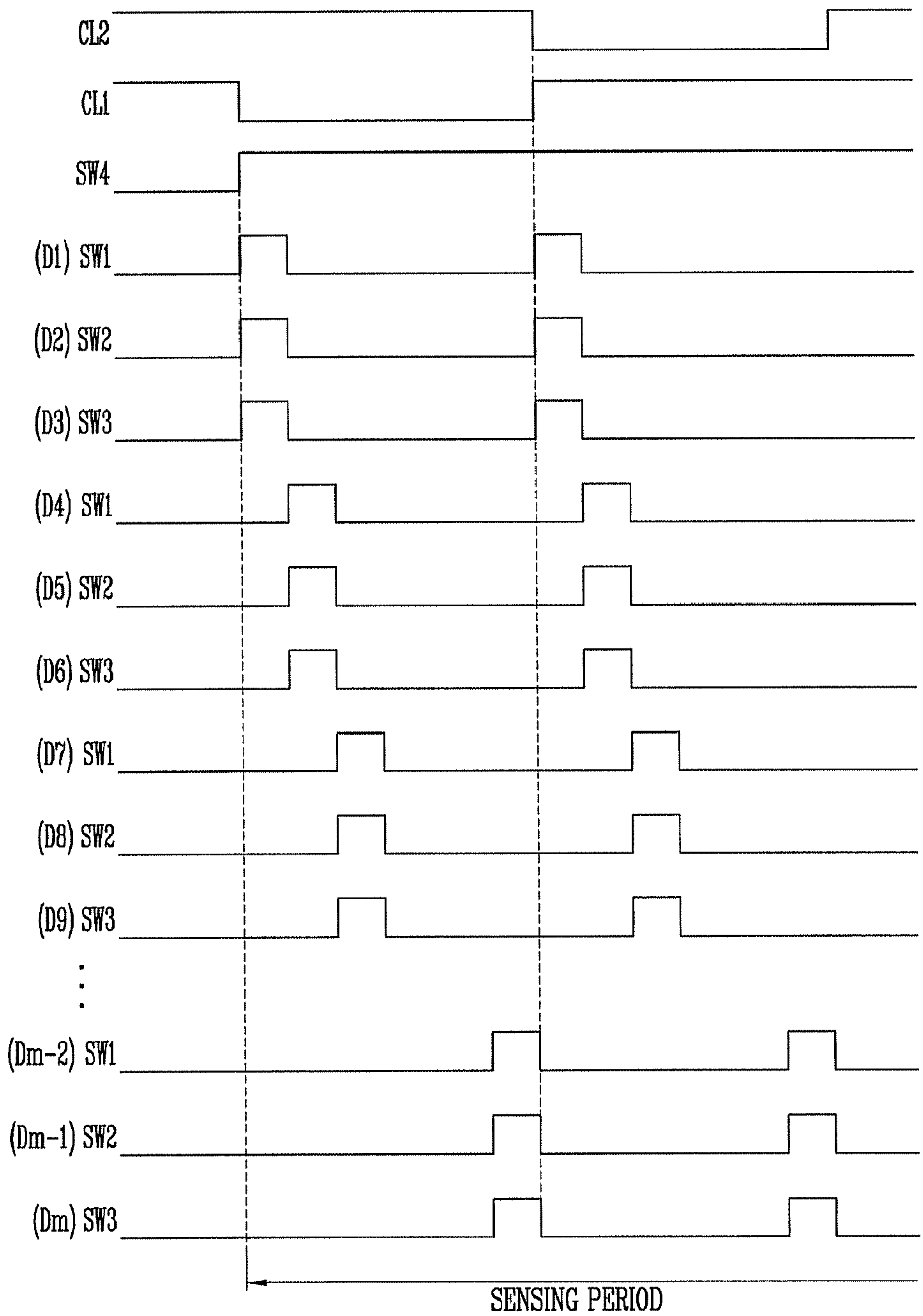

CL2
CL1
SW4
(D1) SW1
(D2) SW2
(D3) SW3
(D4) SW1
(D5) SW2
(D6) SW3
(D7) SW1
(D8) SW2
(D9) SW3
(Dm-2) SW1
(Dm-1) SW2
(Dm) SW3
SENSING PERIOD

FIG. 5A

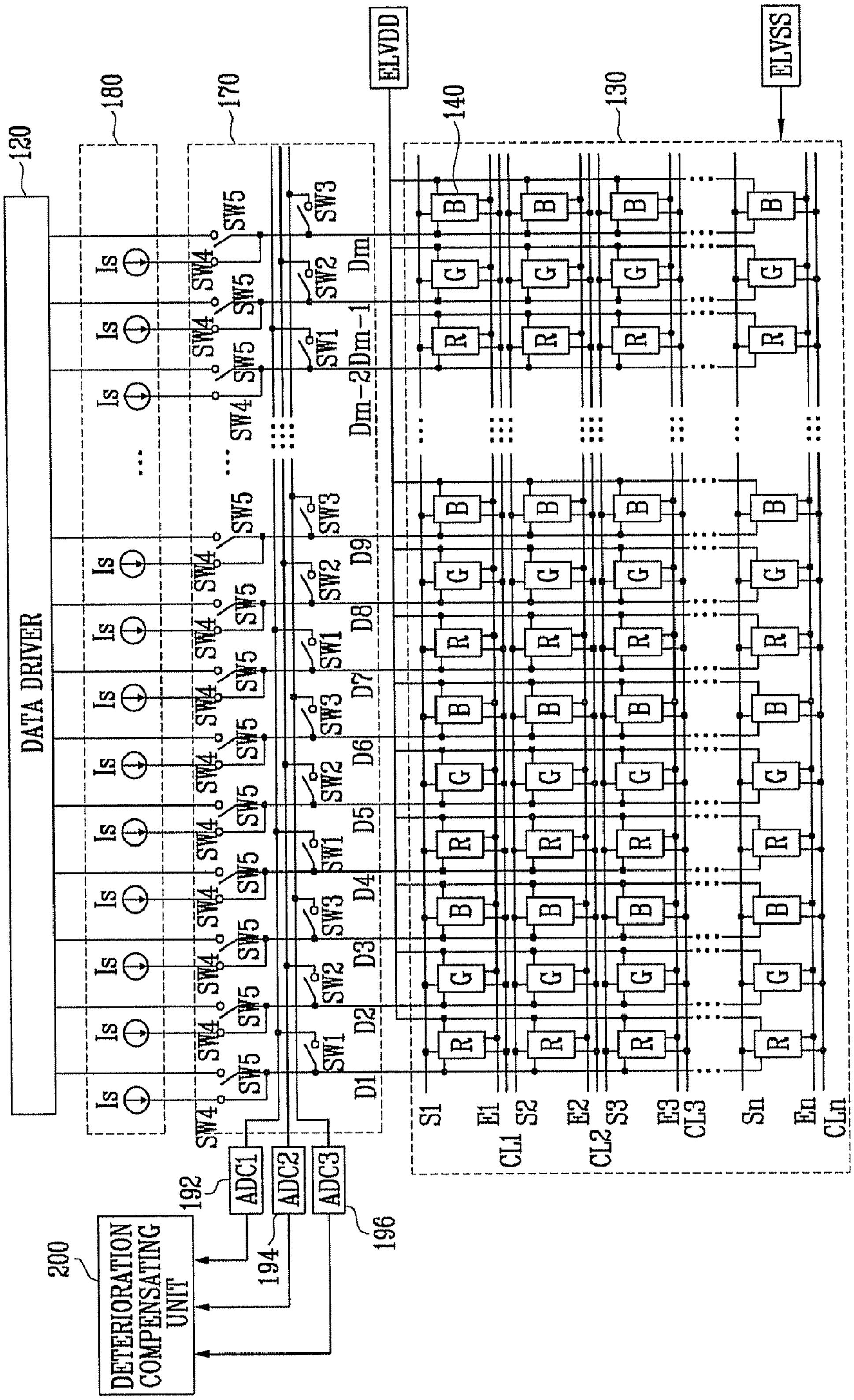

120
DATA DRIVER
180
Is
170
SW1
SW2
SW3
SW4
SW5
D1
D2
D3
D4
D5
D6
D7
D8
D9
Dm-2
Dm-1
Dm
ELVDD
140
130
ELVSS
R
G
B
S1
E1
CL1
S2
E2
CL2
S3
E3
CL3
Sn
En
CLn
192
ADC1
194
ADC2
196
ADC3
200
DETERIORATION COMPENSATING UNIT

FIG. 5B

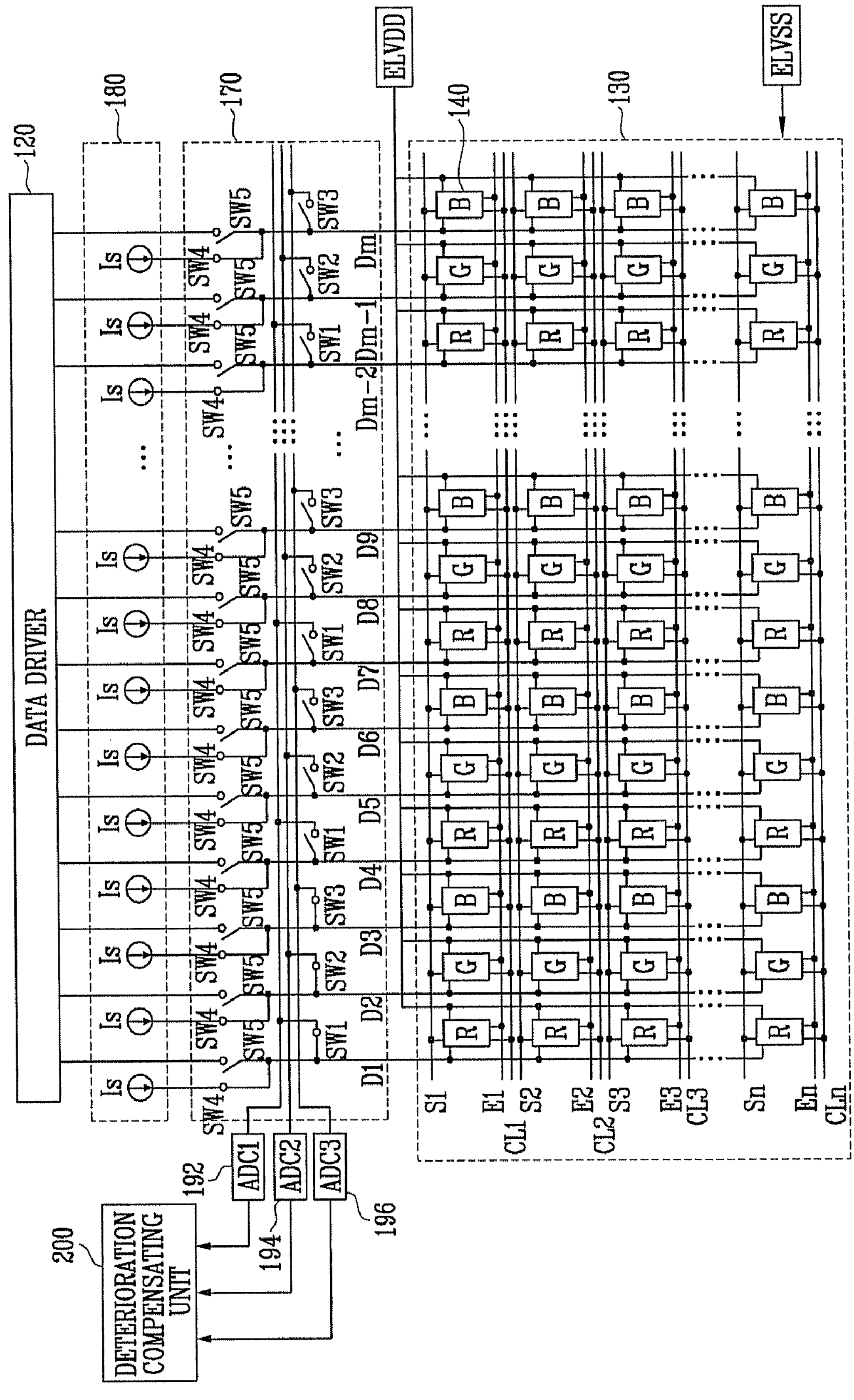

120
DATA DRIVER
180
Is
170
SW4
SW5
SW1
SW2
SW3
D1
D2
D3
D4
D5
D6
D7
D8
D9
Dm-2
Dm-1
Dm
ELVDD
ELVSS
140
130
R
G
B
S1
E1
CL1
S2
E2
CL2
S3
E3
CL3
Sn
En
CLn
192
ADC1
194
ADC2
196
ADC3
200
DETERIORATION COMPENSATING UNIT

FIG. 5C

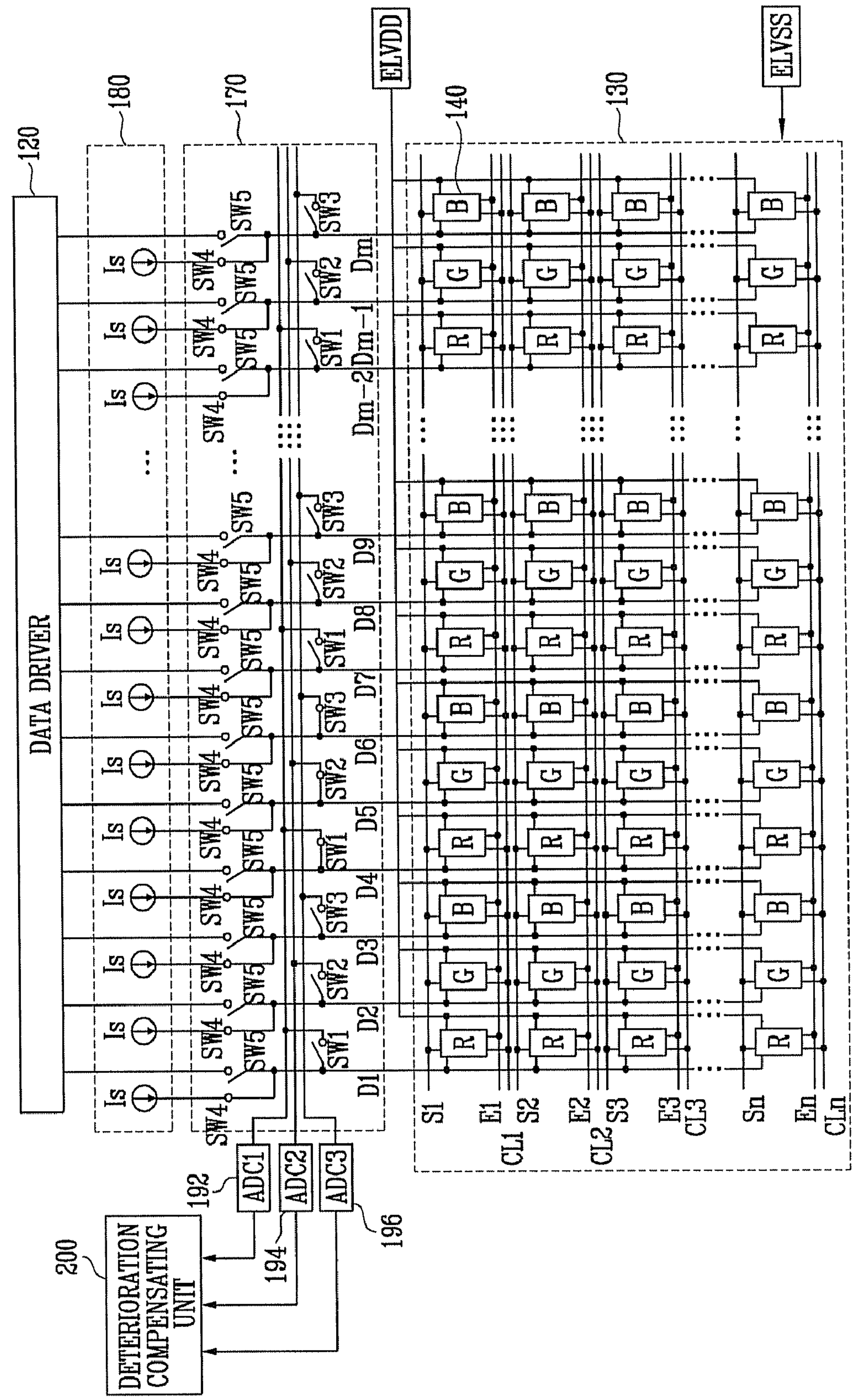

120
DATA DRIVER
180
170
ELVDD
ELVSS
130
140
ADC1
ADC2
ADC3
192
194
196
200
DETERIORATION COMPENSATING UNIT

FIG. 5D

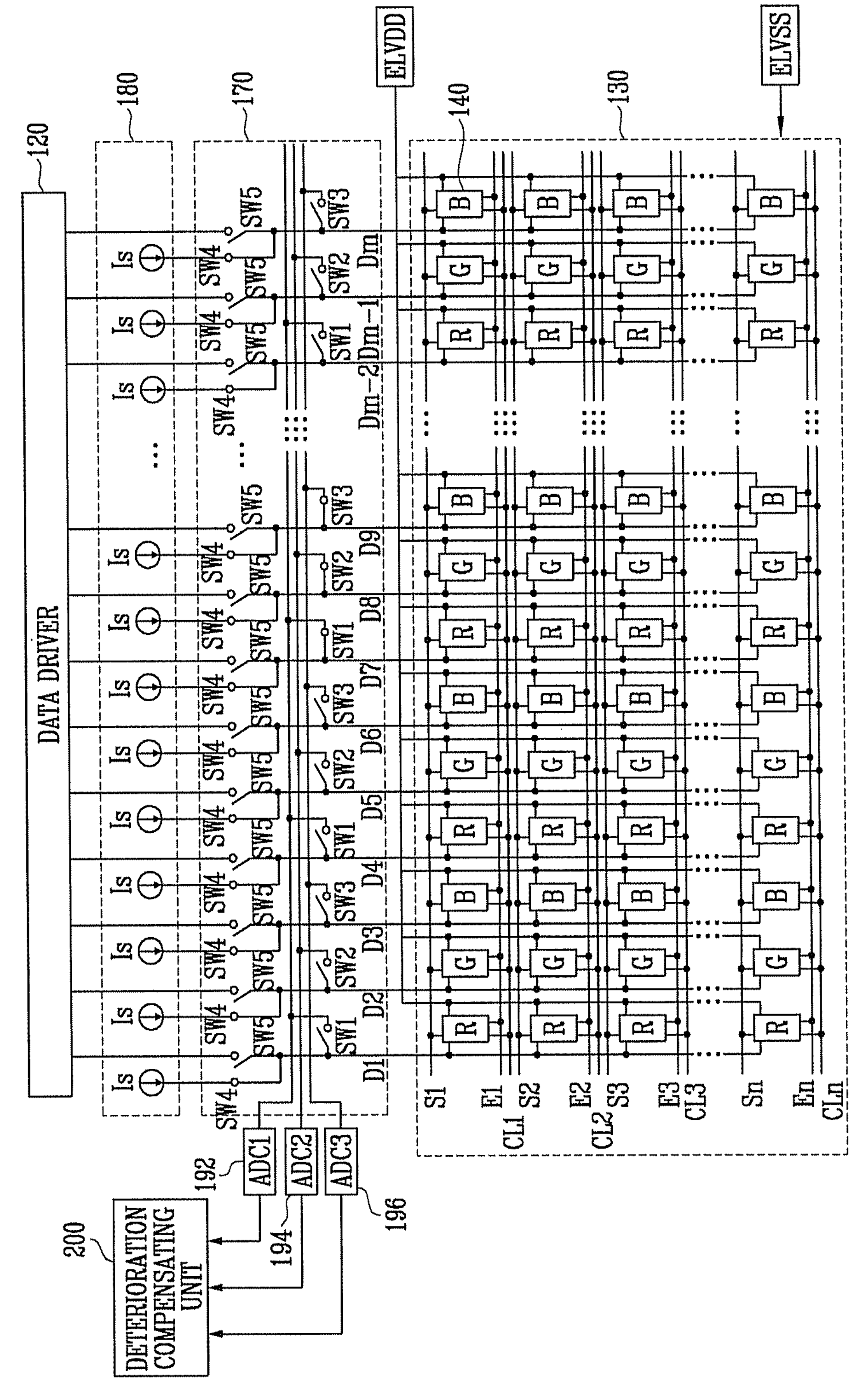
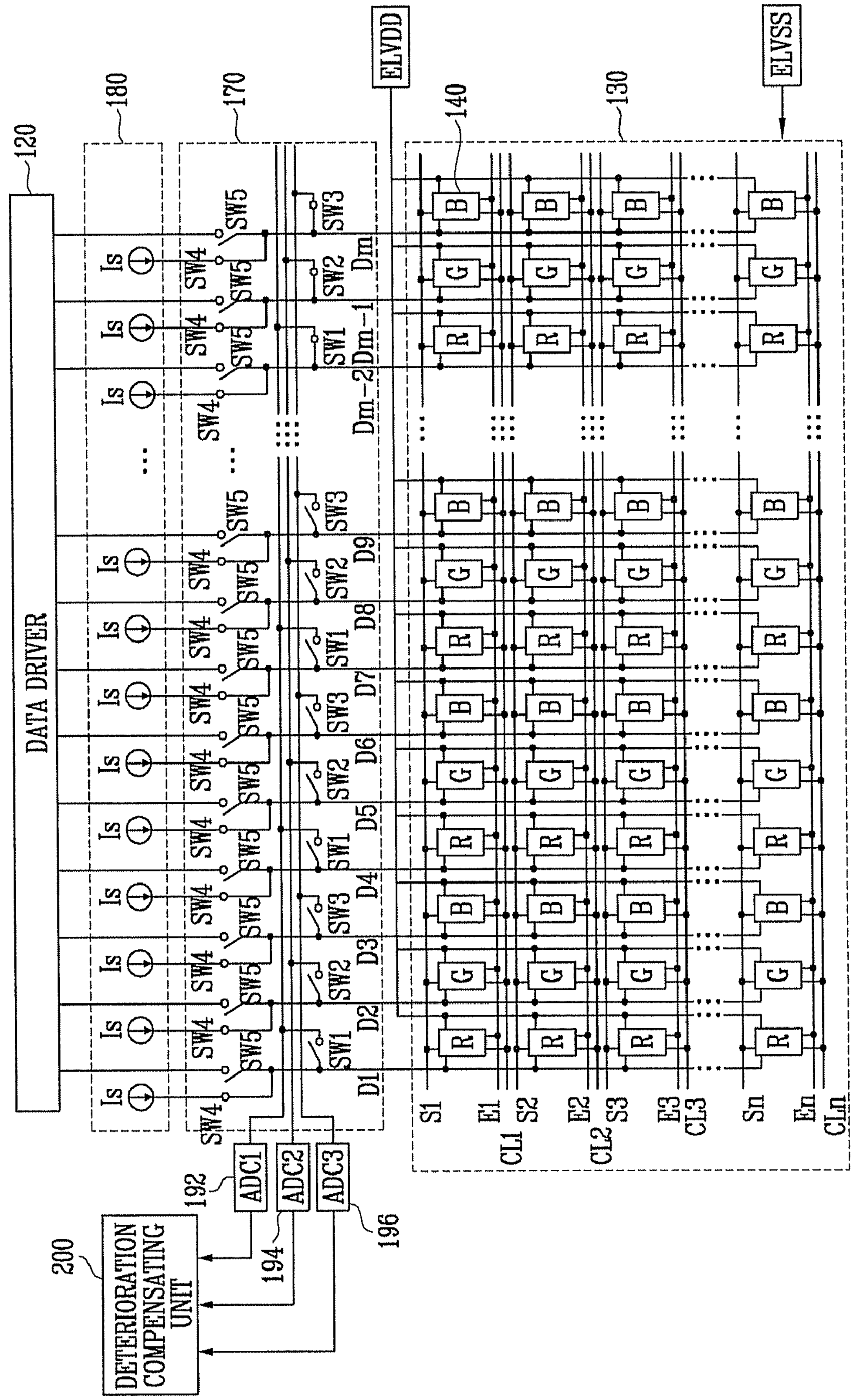

DATA DRIVER
120
180
170
130
140
ELVDD
ELVSS
Is
SW1
SW2
SW3
SW4
SW5
D1
D2
D3
D4
D5
D6
D7
D8
D9
Dm-2
Dm-1
Dm
R
G
B
S1
E1
CL1
S2
E2
CL2
S3
E3
CL3
Sn
En
CLn
ADC1
ADC2
ADC3
192
194
196
200
DETERIORATION COMPENSATING UNIT

FIG. 5E


DATA DRIVER
120
180
170
130
140
ELVDD
ELVSS
Is
SW1
SW2
SW3
SW4
SW5
D1
D2
D3
D4
D5
D6
D7
D8
D9
Dm-2
Dm-1
Dm
R
G
B
S1
E1
CL1
S2
E2
CL2
S3
E3
CL3
Sn
En
CLn
ADC1
ADC2
ADC3
192
194
196
200
DETERIORATION COMPENSATING UNIT

ORGANIC LIGHT EMITTING DISPLAY AND METHOD OF DRIVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of Korean Patent Application No. 2008-6143, filed on Jan. 21, 2008, in the Korean Intellectual Property Office, the entire content of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an organic light emitting display and a method of driving the same, and more particularly, to an organic light emitting display capable of compensating for the deterioration of an organic light emitting diode (OLED) while sharing an analog-to-digital converter (ADC) and a method of driving the same.

[0004] 2. Description of the Related Art

[0005] Recently, various flat panel displays (FPD) capable of reducing weight and volume that are disadvantageous in cathode ray tubes (CRT) have been developed. The FPDs include liquid crystal displays (LCD), field emission displays (FED), plasma display panels (PDP), and organic light emitting displays.

[0006] Among the FPDs, the organic light emitting displays display images using organic light emitting diodes (OLED) that generate light by re-combination of electrons and holes. The organic light emitting display has high response speed and is driven with low power consumption.

[0007] In general, the organic light emitting display displays a desired image while supplying current corresponding to gray scales to organic light emitting diodes (OLED) arranged in pixels. However, the OLEDs deteriorate with the lapse of time so that an image of desired brightness cannot be displayed. Actually, when the OLEDs deteriorate, light with low brightness is gradually generated to correspond to the same data signals.

[0008] In order to solve these problems, various systems capable of compensating for the deterioration of the OLEDs have been proposed. In conventional systems, a predetermined current is supplied to the OLEDs and deterioration information on the OLEDs is determined by using a voltage applied to the OLEDs when the predetermined current is supplied.

[0009] Here, according to a conventional invention, in order to convert the voltage applied to the OLEDs, an analog-to-digital converter (ADC) is provided in each channel. However, when the ADC is provided in each channel, the volume of an integrated circuit (IC) increases and manufacturing cost increases.

SUMMARY OF THE INVENTION

[0010] Accordingly, it is an object of the present invention to provide an organic light emitting display capable of compensating for the deterioration of organic light emitting diodes (OLED) while sharing an analog-to-digital converter (ADC) and a method of driving the same.

[0011] In order to achieve the foregoing and/or other objects of the present invention, an organic light emitting display according to an embodiment of the present invention includes sub pixels positioned in the intersections between scan lines and data lines, a current source unit for supplying predetermined current to organic light emitting diodes (OLED) in a sensing period for grasping deterioration information on the OLEDs included in the sub pixels, at least one analog-to-digital converter (ADC) provided fewer than data lines in order to convert a voltage applied to the OLEDs into a digital signal, and a switching unit for coupling the data lines to the current source unit in the sensing period and for sequentially coupling at least one ADC to the data lines in the sensing period.

[0012] At least one ADC comprises a first analog-to-digital converter (ADC) for converting a voltage of OLEDs included in red sub pixels into a digital signal, a second ADC for converting a voltage of OLEDs included in green sub pixels into a digital signal, and a third ADC for converting a voltage of OLEDs included in blue sub pixels into a digital signal.

[0013] The organic light emitting display further comprises a deterioration compensating unit for controlling digital signals supplied from the first to third ADCs to compensate for deterioration of the OLEDs, a timing controller for changing a bit value of data so that the deterioration can be compensated for by the control of the deterioration compensating unit, a data driver for converting data supplied from the timing controller into data signals to supply the data signals to the data lines, a scan driver for supplying scan signals to the scan lines and for supplying control signals to control lines that run parallel to the scan lines.

[0014] The scan driver turns on transistors positioned between the data lines and the OLEDs in the sub pixels while sequentially supplying the control signals to the control lines in the sensing period.

[0015] The organic light emitting display further comprises fourth switches formed between the current source unit and the data lines, fifth switches formed between the data driver and the data lines, first switches positioned between the data lines coupled to the red sub pixels and the first ADC, second switches positioned between the data lines coupled to the green sub pixels and the second ADC, and third switches positioned between data lines coupled to the blue sub pixels and the third ADC.

[0016] The fourth switches are maintained to be turned on in the sensing period and the fifth switches are maintained to be turned on in a driving period where an image is displayed on the sub pixels. The first switches, the second switches, and the third switches are sequentially turned on when the control signals are supplied. The red sub pixels, the green sub pixels, and the blue sub pixels constitute a pixel and first switches, second switches, and third switches coupled to the same pixel are simultaneously turned on. The current source unit comprises at least one current source for supplying the current.

[0017] A method of driving an organic light emitting display comprises supplying predetermined current to OLEDs included in sub pixels in units of horizontal lines in a sensing period, converting a voltage applied to the OLEDs to correspond to the predetermined current into a digital signal while sharing at least one ADC, changing a bit value of data to compensate for deterioration of the OLEDs to correspond to the digital signal, and generating data signals using the data in a driving period and supplying the data signals to the sub pixels.

[0018] In converting a voltage applied to the OLEDs to correspond to the predetermined current into a digital signal while sharing at least one ADC, the digital signals are generated while sequentially coupling a first ADC to red sub pixels, a second ADC to green sub pixels, and a third ADC to blue sub pixels. The red sub pixels, the green sub pixels, and the blue sub pixels constitute one pixel and the red sub pixels, the green sub pixels, and the blue sub pixels that constitute the same pixel are simultaneously coupled to the first ADC, the second ADC, and the third ADC.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The accompanying drawings, together with the specification, illustrate exemplary embodiments of the present invention, and, together with the description, serve to explain the principles of the present invention.

[0020] FIG. **1** illustrates an organic light emitting display according to an embodiment of the present invention;

[0021] FIG. **2** illustrates a current source unit and a switching unit of FIG. **1**;

[0022] FIG. **3** is a circuit diagram illustrating pixels of FIG. **1**;

[0023] FIG. **4** illustrates waveforms illustrating the operation processes of switches of FIG. **2**; and

[0024] FIGS. **5**A to **5**E illustrate the operation processes of the switches corresponding to the waveforms of FIG. **4**.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0025] 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.

[0026] Hereinafter, exemplary embodiments through which those skilled in the art can easily perform the present invention will be described in detail with reference to FIGS. **1** to **5**E.

[0027] FIG. **1** illustrates an organic light emitting display according to an embodiment of the present invention.

[0028] Referring to FIG. **1**, the organic light emitting display according to an embodiment of the present invention includes a pixel unit **130**, a scan driver **110**, a control line driver **160**, a data driver **120**, and a timing controller **150**.

[0029] In addition, the organic light emitting display according to an embodiment of the present invention further includes analog-to-digital converters (ADC) **192**, **194**, and **196**, a current source unit **180**, a switching unit **170**, and a deterioration compensating unit **200**.

[0030] The pixel unit **130** includes sub-pixels **140** positioned in the intersections of scan lines S1 to Sn, emission control lines E1 to En, control lines CL1 to CLn, and data lines D1 to Dm. The sub pixels **140** receive a first power source ELVDD and a second power source ELVSS from the outside. The sub pixels **140** control the amount of current supplied from the first power source ELVDD to the second power source ELVSS via organic light emitting diodes (OLED) in response to data signals. Then, light with predetermined brightness is generated by the OLEDs.

[0031] The control line driver **160** sequentially supplies control signals to the control lines CL**1** to CLn by the control of the timing controller **150** to drive the control lines CL1 to CLn. Here, the control line driver **160** supplies the control signals while predetermined current is supplied from the current source unit **180** to the sub pixels **140**.

[0032] The scan driver **110** sequentially supplies scan signals to the scan lines S**1** to Sn by the control of the timing controller **150** in a driving period. In addition, the scan driver **110** supplies emission control signals to the emission control lines E1 to En by the control of the timing controller **150**. In such a method, the scan driver **110** drives the scan lines S**1** to Sn and the emission control lines E**1** to En.

[0033] The data driver **120** supplies the data signals to data lines D1 to Dm by the control of the timing controller **150** in the driving period. Therefore, the data driver **120** drives the data lines D**1** to Dm. The switching unit **170** controls coupling the current source unit **180**, the data driver **120**, and the ADCs **192**, **194**, and **196** with the data lines D**1** to Dm. To be specific, the switching unit **170** couples the current source unit **180** to the data lines D**1** to Dm in a sensing period. Then, the switching unit **170** sequentially couples the ADCs **192**, **194**, and **196** to the data lines D**1** to Dm in the sensing period. On the other hand, the switching unit **170** couples the data lines D**1** to Dm to the data driver **120** in the driving period.

[0034] The current source unit **180** supplies predetermined current to the sub pixels **140** via the data lines D1 to Dm in the sensing period. To be specific, the current source unit **180** supplies predetermined current to the data lines D**1** to Dm in the sensing period. At this time, the sub pixels **140** are sequentially selected by the control signals in units of horizontal lines so that predetermined current is supplied to the OLEDs included in the sub pixels **140**. In this case, a voltage corresponding to the predetermined current is applied to the OLEDs.

[0035] On the other hand, the value of the predetermined current supplied from the current source unit **180** is experimentally determined so that a sufficient voltage is applied to the OLEDs. For example, the current source unit **180** can supply current corresponding to the brightest gray level to the OLEDs.

[0036] The ADCs **192**, **194**, and **196** convert the voltage applied to the OLEDs of the sub pixels **140** into a digital signal.

[0037] To be specific, the first ADC **192** is sequentially coupled to the red sub pixels **140** by the control of the switching unit **170** in the sensing period. The first ADC **192** converts the voltage applied to the OLEDs of the red sub pixels **140** into the digital signal to supply the digital signal to the deterioration compensating unit **200**.

[0038] The second ADC **194** is sequentially coupled to the green sub pixels **140** by the control of the switching unit **170** in the sensing period. The second ADC **194** converts the voltage applied to the OLEDs of the green sub pixels **140** into the digital signal to supply the digital signal to the deterioration compensating unit **200**.

[0039] The third ADC **196** is sequentially coupled to the blue sub pixels **140** by the control of the switching unit **170** in the sensing period. The third ADC **196** converts the voltage applied to the OLEDs of the green sub pixels **140** into the digital signal to supply the digital signal to the deterioration compensating unit **200**.

[0040] The deterioration compensating unit **200** compensates for the deterioration of the OLEDs using the digital signal supplied from the ADCs **192**,**194**, and **196**. To be specific, the deterioration compensating unit **200** controls the timing controller **150** to compensate for the deterioration of the OLEDs included in the sub pixels **140** using the digital signal supplied from the ADCs **192**, **194**, and **196**. Here, the deterioration compensating unit **200** includes structures disclosed in applications previously filed or currently published by the applicant. Since the ADCs **192**, **194**, and **196** are shared according to the present invention, the detailed structure and description of the deterioration compensating unit **200** will be omitted.

[0041] The timing controller **150** controls the data driver **120**, the scan driver **110**, and the control line driver **160**. In addition, the timing controller **150** converts the bit value of first data Data**1** input from the outside into second data Data**2** so that the deterioration can be compensated for by the control of the deterioration compensating unit **200**. Here, the first data Data**1** is set as i (i is a natural number) bits and the second data Data**2** is set as j (j is a natural number no less than i) bits.

[0042] The second data Data**2** generated by the timing controller **150** is supplied to the data driver **120**. Then, the data driver **120** generates the data signals using the second data Data**2** and supplies the generated data signals to the sub pixels **140**.

[0043] FIG. **2** illustrates the current source unit and the switching unit of FIG. **1**.

[0044] Referring to FIG. **2**, the current source unit **180** according to the present invention includes current sources Is formed in channels.

[0045] The current sources Is supplies predetermined current to the data lines D1 to Dm in the sensing period. The predetermined current supplied to the data lines D1 to Dm is supplied to the sub pixels **140** selected by the control signals. In this case, a voltage corresponding to the predetermined current is applied to the OLEDs included in the sub pixels **140**.

[0046] On the other hand, in FIG. **2**, it was described that the current sources Is are provided in the channels. However, the present invention is not limited to the above. For example, one current source Is can be coupled to all of the fourth switches SW4.

[0047] In addition, current sources for supplying current to the red sub pixels R, the green sub pixels G, and the blue sub pixels B can vary. To be specific, the OLEDs included in the red sub pixels R, the green sub pixels G, and the blue sub pixels B are formed of different materials. Therefore, the current sources for supplying current to the red sub pixels R, the green sub pixels G, and the blue sub pixels B can vary to supply different currents in consideration of the characteristics of the OLEDs included in the sub pixels R, G, and B.

[0048] The switching unit **170** includes fourth switches SW4 and fifth switches SW**5** and first to third switches SW**1** to SW**3** formed in the channels. Here, the first switches SW**1**, the second switches SW**2**, and the third switches SW**3** are formed to be coupled to the data lines D**1**, D**4**, . . . coupled to the red sub pixels R, the data lines D2, D**5**, . . . coupled to the green sub pixels G, and the data lines D3, D**6**, . . . coupled to the blue sub pixels B.

[0049] The fourth switches SW4 are positioned between the current sources Is and the data lines D. The fourth switches SW4 are turned on in the sensing period. Here, the sensing period is a period in which the deterioration of the OLEDs included in the sub pixels **140** is measured and is provided in various points of time by a designer. For example, the sensing period can be positioned at the point of time where a power source is supplied to the organic light emitting display.

[0050] The fifth switches SW**5** are positioned between the data driver **120** and the data lines D. The fifth switches SW**5** are turned on in the driving period. Here, the driving period is a period in which a predetermined image is displayed by the sub pixels **140** excluding the sensing period.

[0051] The first switches SW**1** are formed between the data lines D**1**, D**4**, . . . coupled to the red sub pixels R and the first ADC **192**. The first switches SW**1** are sequentially turned on whenever the control signals are supplied to the control lines CL**1** to CLn.

[0052] The second switches SW**2** are formed between the data lines D2, D5, . . . and the second ADC **194**. The Second switches SW**2** are sequentially turned on whenever the control signals are supplied to the control lines CL**1** to CLn.

[0053] The third switches SW3 are formed between the data lines D3, D6, . . . coupled to the blue sub pixels B and the third ADC **196**. The third switches SW3 are sequentially turned on whenever the control signals are supplied to the control lines CL**1** to CLn.

[0054] FIG. **3** illustrates a sub pixel according to an embodiment of the present invention. In FIG. **3**, for convenience sake, the pixel coupled to the mth data line Dm and the nth scan line Sn is illustrated.

[0055] Referring to FIG. **3**, the sub pixel **140** according to an embodiment of the present invention includes an OLED and a pixel circuit **142** for supplying current to the OLED.

[0056] The anode electrode of the OLED is coupled to the pixel circuit **142** and the cathode electrode of the OLED is coupled to the second power source ELVSS. The OLED generates light with predetermined brightness in response to the current supplied from the pixel circuit **142**.

[0057] The pixel circuit **142** receives the data signal from the data line Dm when the scan signal is supplied to the scan line Sn. In addition, the pixel circuit **142** receives predetermined current from the current source unit **180** when the control signal is supplied to the control line CLn and supplies a voltage corresponding to the received current to the third ADC **196**. Therefore, the pixel circuit **142** includes four transistors M1 to M4 and a storage capacitor Cst.

[0058] The gate electrode of the first transistor M**1** is coupled to the scan line Sn and the first electrode of the first transistor M**1** is coupled to the data line Dm. Then, the second electrode of the first transistor M**1** is coupled to the first terminal of a storage capacitor Cst. The first transistor M**1** is turned on when the scan signal is supplied to the scan line Sn. Here, the scan signal is supplied while a voltage corresponding to the data signal is charged in the storage capacitor Cst.

[0059] The gate electrode of the second transistor M**2** is coupled to the first terminal of the storage capacitor Cst and the first electrode of the second transistor M**2** is coupled to the second terminal of the storage capacitor Cst and the first power source ELVDD. The second transistor M**2** controls the amount of current that flows from the first power source ELVDD to the second power source ELVSS via the OLED to correspond to the value of the voltage stored in the storage capacitor Cst. At this time, the OLED generates light corresponding to the amount of current supplied from the second transistor M**2**.

[0060] The gate electrode of the third transistor M**3** is coupled to the emission control line En and the first electrode of the third transistor M**3** is coupled to the second electrode of the second transistor M**2**. Then, the second electrode of the third transistor M**3** is coupled to the OLED. The third transistor M**3** is turned off when the emission control signal is supplied to the emission control line En and is turned on when the emission control signal is not supplied. Here, the emission control signal is supplied in a period where the voltage corresponding to the data signal is charged in the storage capacitor Cst and in the sensing period where deterioration information on the OLED is sensed.

[0061] The gate electrode of the fourth transistor **M4** is coupled to the control line CLn and the first electrode of the fourth transistor **M4** is coupled to the second electrode of the third transistor **M3**. In addition, the second electrode of the fourth transistor **M4** is coupled to the data line Dm. The fourth transistor **M4** is turned on when the control signal is supplied to the control line CLn and is turned off in the other cases. Here, the control signals supplied to the control lines CL**1** to CLn are sequentially supplied in the sensing period.

[0062] FIG. **4** illustrates waveforms illustrating the operation processes of the switches of FIG. **2**. FIGS. **5**A to **5**E illustrate the operation processes of the switches corresponding to the waveforms of FIG. **4**.

[0063] Referring to FIGS. **4** to **5**E, operation processes will be described in detail. First, the control signals are sequentially supplied to the control lines CL**1** to CLn in the sensing period. Then, in the sensing period, as illustrated in FIG. **5**A, the fourth switches SW**4** are maintained to be turned on.

[0064] First, when the control signal is supplied to the first control line CL**1**, the fourth transistor M**4** included in the sub pixels **140** coupled to the first control line CL**1** is turned on. Then, the current of the current sources Is is supplied to the OLEDs of the sub pixels **140** via the data lines D**1** to Dm and the fourth transistor M**4**. At this time, a predetermined voltage corresponding to the deterioration is applied to the OLED.

[0065] In a period where the control signal is supplied to the first control line CL**1**, the first switches SW**1**, the second switches SW**2**, and the third switches SW**3** are sequentially turned on in units of pixels. To be specific, the red sub pixels R, the green sub pixels G, and the blue sub pixels B constitute one pixel. Here, the first switches SW**1**, the second switches SW**2**, and the third switches SW**3** are turned on in units of pixels to provide the voltage applied to the OLED to the ADCs **192**, **194**, and **196**.

[0066] Actually, as illustrated in FIGS. **5**B to **5**E, the first switches SW**1** are sequentially turned on. Then, the second switches SW**2** and the third switches SW**3** are sequentially turned on. Here, the switches SW**1**, SW**2**, and SW**3** coupled to the sub pixels **140** that constitute the same pixel are simultaneously turned on to supply the voltage applied to the OLEDs of the sub pixels **140** to the ADCs **192**,**194**, and **196**. Then, the ADCs **192**,**194**, and **196** convert the voltage supplied thereto into a digital signal to supply the digital signal to the deterioration compensating unit **200**.

[0067] Then, the supply of the control signal to the first control line CL**1** is stopped and the control signal is supplied to the second control line CL**2**. Then, as illustrated in FIGS. **5**B to **5**E, the first to third switches SW**1** to SW**3** are sequentially turned on to supply the voltage applied to the OLEDs of the sub pixels **140** coupled to the second control line CL**2** to the ADCs **192**, **194**, and **196**.

[0068] Actually, according to the present invention, in the sensing period, the control signals are sequentially supplied from the first control line CL**1** to the nth control line CLn. Then, the switches SW**1** to SW**3** are sequentially turned on in units of pixels in periods where the control signals are supplied to supply the voltage corresponding to the deterioration of the sub pixels **140** to the ADCs **192**, **194**, and **196**.

[0069] Then, the deterioration compensating unit **200** controls the timing controller **150** using the digital signal (deterioration information) supplied from the ADCs **192**,**194**, and **196**. Then, the timing controller **150** changes the bit value of the first data Data**1** into the second data Data**2** and supplies the generated second data Data**2** to the data driver **120** to compensate for the deterioration. The data driver **120** generates the data signals using the second data Data**2** in the driving period to supply the generated data signals to the data lines D**1** to Dm. Therefore, in the driving period, the fifth switches SW**5** are turned on.

[0070] As described above, according to the present invention, deterioration information on the sub pixels **140** can be provided to the deterioration compensating unit **200** while sharing the three ADCs **192**, **194**, and **196**. On the other hand, according to the present invention, the number of ADCs **192**, **194**, and **196** can be at least one (smaller than the number of data lines). For example, when one ADC is provided, the first switches SW**1**, the second switches SW**2**, and the third switches SW**3** are sequentially turned on (in units of sub pixels) to provide the deterioration information on the sub pixels **140** to the ADC.

[0071] In the organic light emitting display according to the present invention and the method of driving the same, the voltage applied to the OLEDs can be converted into the digital signal while sharing the ADC converter. Therefore, according to the present invention, manufacturing cost can be reduced and the volume of an integrated circuit (IC) is reduced to secure a degree of freedom of design.

[0072] 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. An organic light emitting display, comprising:

sub pixels positioned in the intersections between scan lines and data lines;

a current source unit supplying predetermined current to organic light emitting diodes (OLED) in a sensing period for grasping deterioration information on the OLEDs included in the sub pixels;

at least one analog-to-digital converter (ADC) provided fewer than data lines in order to convert a voltage applied to the OLEDs into a digital signal; and

a switching unit coupling the data lines to the current source unit in the sensing period and sequentially coupling at least one ADC to the data lines in the sensing period.

2. The organic light emitting display as claimed in claim **1**, wherein at least one ADC comprises:

a first analog-to-digital converter (ADC) converting a voltage of OLEDs included in red sub pixels into a digital signal;

a second ADC converting a voltage of OLEDs included in green sub pixels into a digital signal; and

a third ADC converting a voltage of OLEDs included in blue sub pixels into a digital signal.

3. The organic light emitting display as claimed in claim **2**, further comprising:

a deterioration compensating unit controlling digital signals supplied from the first to third ADCs so that deterioration of the OLEDs is compensated for;

a timing controller changing a bit value of data to compensate for the deterioration by the control of the deterioration compensating unit;

a data driver converting data supplied from the timing controller into data signals to supply the data signals to the data lines;

a scan driver supplying scan signals to the scan lines and supplying control signals to control lines that run parallel to the scan lines.

4. The organic light emitting display as claimed in claim **3**, wherein the scan driver turns on transistors positioned between the data lines and the OLEDs in the sub pixels while sequentially supplying the control signals to the control lines in the sensing period.

5. The organic light emitting display as claimed in claim **4**, further comprising:

fourth switches formed between the current source unit and the data lines;

fifth switches formed between the data driver and the data lines;

first switches positioned between the data lines coupled to the red sub pixels and the first ADC;

second switches positioned between the data lines coupled to the green sub pixels and the second ADC; and

third switches positioned between data lines coupled to the blue sub pixels and the third ADC.

6. The organic light emitting display as claimed in claim **5**,

wherein the fourth switches are maintained to be turned on in the sensing period, and the fifth switches are maintained to be turned on in a driving period where an image is displayed on the sub pixels.

7. The organic light emitting display as claimed in claim **5**, wherein the first switches, the second switches, and the third switches are sequentially turned on when the control signals are supplied.

8. The organic light emitting display as claimed in claim **7**,

wherein the red sub pixels, the green sub pixels, and the blue sub pixels constitute a pixel, and

first switches, second switches, and third switches coupled to the same pixel are simultaneously turned on.

9. The organic light emitting display as claimed in claim **1**, wherein the current source unit comprises at least one current source for supplying the current.

10. A method of driving an organic light emitting display, comprising:

supplying predetermined current to OLEDs included in sub pixels in units of horizontal lines in a sensing period;

converting a voltage applied to the OLEDs to correspond to the predetermined current into a digital signal while sharing at least one ADC;

changing a bit value of data to compensate for deterioration of the OLEDs corresponding to the digital signal; and

generating data signals using the data in a driving period and supplying the data signals to the sub pixels.

11. The method as claimed in claim **10**, wherein the converting a voltage applied to the OLEDs to correspond to the predetermined current into a digital signal while sharing at least one ADC comprises generating the digital signals while sequentially coupling a first ADC to red sub pixels, a second ADC to green sub pixels, and a third ADC to blue sub pixels.

12. The method as claimed in claim **11**,

wherein the red sub pixels, the green sub pixels, and the blue sub pixels constitute one pixel, and

the red sub pixels, the green sub pixels, and the blue sub pixels that constitute the same pixel are simultaneously coupled to the first ADC, the second ADC, and the third ADC.

* * * * *

专利名称(译)	有机发光显示器及其驱动方法		
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[标]申请(专利权)人(译)	汉阳大学校产学协力团		
申请(专利权)人(译)	三星SDI CO.，LTD. IUCF-HYU		
当前申请(专利权)人(译)	IUCF-HYU（产学合作基金会汉阳大学） 三星DISPLAY CO.，LTD.		
[标]发明人	KWON OH KYONG		
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摘要(译)

提供了一种有机发光显示器，其能够在共享模数转换器（ADC）的同时补偿有机发光二极管（OLED）的劣化。有机发光显示器包括位于扫描线和数据线之间的交叉点中的子像素，用于在感测周期中向有机发光二极管（OLED）提供预定电流的电流源单元，用于掌握包括在子部件中的OLED上的劣化信息像素，至少一个模数转换器（ADC）提供的数据线少于数据线，以便将施加到OLED的电压转换成数字信号，以及用于将数据线耦合到电流源单元的开关单元。感测周期以及在感测周期中将至少一个ADC顺序耦合到数据线。