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Declarations under Rule 4.17:

— *as to the identity of the inventor (Rule 4.17(i))*

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*

[Continued on next page]

(54) Title: PIXEL CIRCUITS AND DRIVING SCHEMES FOR ACTIVE MATRIX ORGANIC LIGHT EMITTING DIODES

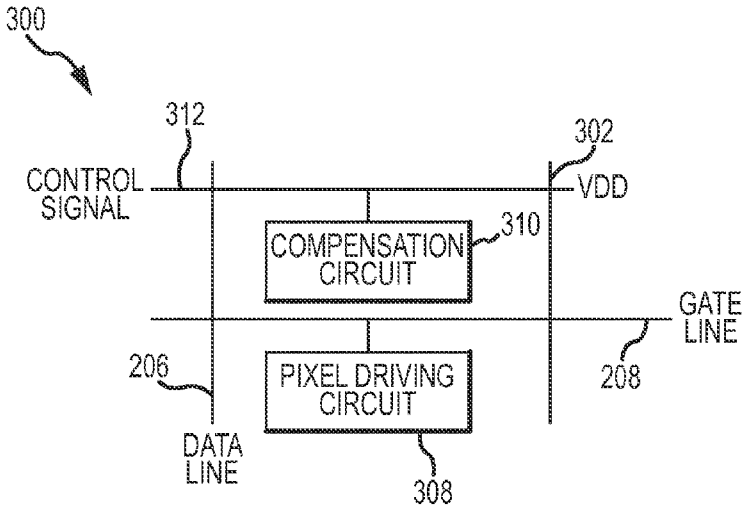

FIG.3

(57) Abstract: A pixel driving circuit includes a storage capacitor, a first, a second, and a third transistor. A method for driving an organic light emitting diode (OLED) display includes controlling the second transistor by a first signal from a gate line such that the second transistor is switched "Off" for a first phase, and "On" for a second phase and a third phase, "Off" for a fourth phase. During the second phase, storing a threshold voltage of the first transistor on the storage capacitor coupled between the gate and the source of the first transistor. During the third phase, supplying a data voltage from a data line to the gate of the first transistor, and switching off the third transistor by a second signal such that the voltage at an anode of the OLED does not vary with pixel location and provides brightness uniformity for the display.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/011488

A. CLASSIFICATION OF SUBJECT MATTER
INV. G09G3/32
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012/062130 A1 (ONO SHINYA [JP]) 15 March 2012 (2012-03-15) paragraphs [0003], [0125] - [0128], [0133] - paragraph [0157]; figures 3,4	1-10
X	US 2008/198111 A1 (YAMASHITA JUNICHI [JP] ET AL) 21 August 2008 (2008-08-21) paragraphs [0007], [0061], [0063] - [0065], [0068] - paragraph [0079]; figures 7,8,9	1-3,5, 8-10
X	US 2012/105421 A1 (TSAI TSUNG-TING [TW] ET AL) 3 May 2012 (2012-05-03) paragraph [0015] - paragraph [0021]; figures 2,3	1-4,6-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 May 2014	18/08/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Adarska, Veneta

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/011488

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2014/011488

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		US 2012105421 A1	03-05-2012

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

a method of driving a pixel circuit including an organic light emitting diode, a storage capacitor, a first transistor for driving the OLED, a second transistor for switching the OLED, and a third transistor, wherein the method comprises a reset phase as a first phase, VT-generation phase as a second phase, programming phase as a third phase and a driving phase as a fourth phase, the method is directed to compensating the brightness non-uniformity due to RC delay in gate lines by switching off the third transistor in the programming phase

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2. claims: 11-19

a method of driving a pixel circuit including an organic light emitting diode, a storage capacitor and first to third transistors, the method reducing the row time by performing parallel operation of different rows during different phases and for each row providing a first value of data voltage from a data line to the gate of the first transistor during a reset phase, a second value of data voltage from the data line during a VT-generation phase and a third value of data voltage during a programming phase, wherein the second value of the data voltage being higher than the first value and the third value being higher than the second value.
