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(81) Designated States (unless otherwise indicated, for every kind of national protection available):

AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: DISPLAY MODULE AND SYSTEM APPLICATIONS

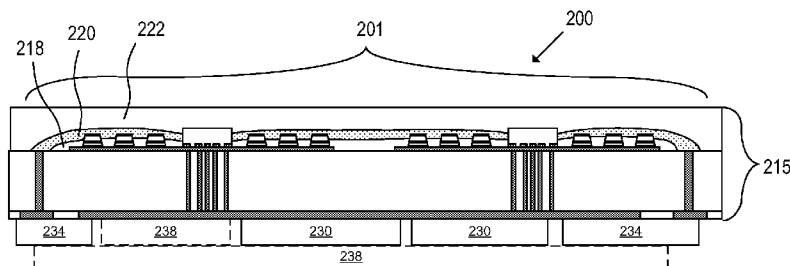


FIG. 4

(57) Abstract: A display module (201) and system applications including a display module are described. The display module may include a display substrate (202) including a front surface (203), a back surface (205), and a display area (201) on the front surface. A plurality of interconnects (204, 206) extend through the display substrate from the front surface to the back surface. An array (214) of light emitting diodes (LEDs) are in the display area and electrically connected with the plurality of interconnects, and one or more driver circuits (230, 234) are on the back surface of the display substrate. Exemplary system applications include wearable, rollable, and foldable displays.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/067190

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G06F1/16 G04G17/04 G09G3/32 G09F9/33 H05K1/11
 H05K1/18
 ADD. H01L25/075 H01L25/16
 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)
 H01L G06F G04G G09G G09F H05K

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. |
|-----------|--|-----------------------|
| X | TAKAHASHI K ET AL: "HIGH DENSITY LED DISPLAY PANEL ON SILICON MICROREFLECTOR AND INTEGRATED CIRCUIT", 1995 JAPAN IEMT SYMPOSIUM. PROCEEDINGS OF THE 1995 JAPAN INTERNATIONAL ELECTRONIC MANUFACTURING TECHNOLOGY SYMPOSIUM. OMIYA, DEC. 4 - 6, 1995; [PROCEEDINGS OF THE (JAPAN) INTERNATIONAL ELECTRONIC MANUFACTURING TECHNOLOGY SYMPOSIUM], NEW YORK, IEEE, U, 4 December 1995 (1995-12-04), pages 272-275, XP000686779, ISBN: 978-0-7803-3623-0 figure 5 | 1-3,5,6 |
| X | EP 2 150 031 A1 (LG ELECTRONICS INC [KR]) 3 February 2010 (2010-02-03) claims; figures | 1,7,8, 11-13 |
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

| | |
|---|---|
| <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> |
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| Date of the actual completion of the international search 16 March 2015 | Date of mailing of the international search report 29/07/2015 |
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| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016 | Authorized officer Ott, André |
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/067190

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|---|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | US 2012/253485 A1 (WEAST AARON B [US] ET AL) 4 October 2012 (2012-10-04) paragraph [0122] - paragraph [0130]; figures 15, 16 ----- | 1-15 |
| Y | EP 2 650 935 A2 (LG INNOTEK CO LTD [KR]) 16 October 2013 (2013-10-16) paragraph [0056]; figure 2 ----- | 1-18 |
| Y | US 2006/061555 A1 (MULLEN JEFFREY D [US]) 23 March 2006 (2006-03-23) figure 2 ----- | 16-18 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/067190

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.:

1-18

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-18

Constructional details of a display module

2. claims: 19-21

A non-transitory computer-readable medium

3. claims: 22-24

Graphical user interface manager

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/067190

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date | |
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