

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
12 April 2007 (12.04.2007)

PCT

(10) International Publication Number  
**WO 2007/041262 A3**

(51) International Patent Classification:  
**B81C 1/00** (2006.01)

(21) International Application Number:  
PCT/US2006/037970

(22) International Filing Date:  
27 September 2006 (27.09.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
11/240,303 29 September 2005 (29.09.2005) US

(71) Applicant (for all designated States except US): **MIRADIA INC.** [US/US]; 281 East Jave Drive, Sunnyvale, California 94089 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HUANG, Kegang** [US/US]; 49198 Violet Terrace, Fremont, California 94539 (US). **YANG, Xiao** [CN/US]; 19500 Pruneridge Avenue, Apt. 6101, Cupertino, California 95014 (US). **CHEN, Dongmin** [US/US]; 19502 Via Monte Drive, Saratoga, California 95070 (US).

(74) Agents: **TOBIN, Kent, J.** et al.; TOWNSEND AND TOWNSEND AND CREW LLP, Two Embarcadero Center, 8th Floor, San Francisco, California 94111-3834 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

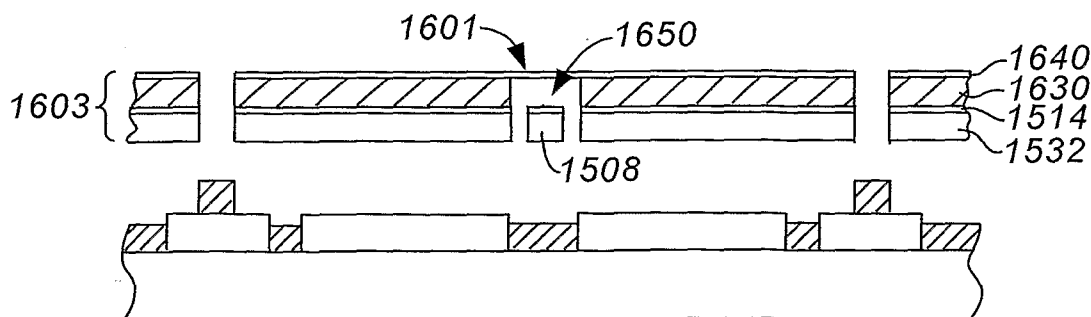
**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:  
13 December 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD OF FABRICATING REFLECTIVE SPATIAL LIGHT MODULATOR HAVING HIGH CONTRAST RATIO



(57) Abstract: The contrast offered by a spatial light modulator device may be enhanced by positioning nonreflective elements such as supporting posts and moveable hinges, behind the reflecting surface of the pixel. In accordance with one embodiment, the reflecting surface is suspended over and underlying hinge-containing layer by integral ribs of the reflecting material defined by gaps in a sacrificial layer. In accordance with an alternative embodiment, the reflecting surface is separated from the underlying hinge by a gap formed in an intervening layer, such as oxide. In either embodiment, walls separating adjacent pixel regions may be recessed beneath the reflecting surface to further reduce unwanted scattering of incident light and thereby enhance contrast.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/37970

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B81C 1/00 (2007.01)

USPC - 216/24

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)

IPC(8) - B81C 1/00; B81B 7/02 (2007.01)

USPC - 216/2,24; 438/29; 359/291,871

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

IEEE Journal of Microelectromechanical Systems (1992-2007)

Micromachined Transducers Sourcebook, Greg Kovacs, 1998

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

USPTO EAST System (US, USPG-PUB, EPO, JPO, FPRS, DERWENT), IP.com, DialogPro

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,652,671 A (KNIPE et al) 29 July 1997 (29.07.1997) entire document	16-20
Y	US 5,018,256 A (HORNBECK) 28 May 1991 (28.05.1991) column 1, lines 45-60	16-20
Y	US 5,535,047 A (HORNBECK) 09 July 1996 (09.07.1996) column 3, lines 9-38, Fig. 13	17
Y	US 5,650,881 A (HORNBECK) 22 July 1997 (22.07.1997) Fig. 4s, column 8, lines 53-65\	18
A	US 2004/0004753 A1 (PAN) 08 January 2004 (08.01.2004) entire document	1-20

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

\* 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

21 March 2007

Date of mailing of the international search report

10 OCT 2007

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774