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(71) Applicant (for all designated States except US): **TELA INNOVATIONS, INC.** [US/US]; 655 Campbell Technology Pkwy, Suite 150, Campbell, CA 95008 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BECKER, Scott, T.** [US/US]; 655 Campbell Technology Pkwy, Suite 150, Campbell, CA 95008 (US).

(74) Agent: **WRIGHT, Kenneth, D.**; Martine Penilla & Gen-carella, LLP, 710 Lakeway Drive, Suite 200, Sunnyvale, CA 94085 (US).

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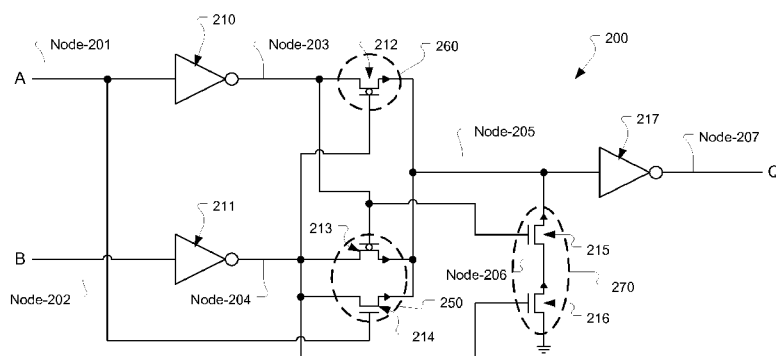


Fig. 2A

(57) Abstract: An exclusive-or circuit includes a pass gate controlled by a second input node. The pass gate is connected to pass through a version of a logic state present at a first input node to an output node when so controlled. A transmission gate is controlled by the first input node. The transmission gate is connected to pass through a version of the logic state present at the second input node to the output node when so controlled. Pullup logic is controlled by both the first and second input nodes. The pullup logic is connected to drive the output node low when both the first and second input nodes are high. An exclusive-nor circuit is defined similar to the exclusive-or circuit, except that the pullup logic is replaced by pulldown logic which is connected to drive the output node high when both the first and second input nodes are high.

INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. H03K19/21

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)

H03K

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/181310 A1 (RHEE YOUNG-CHUL [KR]) 17 August 2006 (2006-08-17) paragraph [0004] - paragraph [0006]; figures 1-2	1-11, 20-30
X	US 4 424 460 A (BEST DAVID W [US]) 3 January 1984 (1984-01-03) column 2, line 3 - column 4, line 12	1-11, 20-30
A	US 5 973 507 A (YAMAZAKI HIROSHI [JP]) 26 October 1999 (1999-10-26) column 9, line 23 - column 10, line 3	1-11, 20-30
A	US 6 356 112 B1 (TRAN DZUNG JOSEPH [US] ET AL) 12 March 2002 (2002-03-12) column 3, line 43 - column 5, line 15	1-11, 20-30
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☒ 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 document but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
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- "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
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"&" document member of the same patent family

Date of the actual completion of the international search

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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

Villafuerte Abrego

INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 796 624 A (SRIDHAR RAMALINGAM [US] ET AL) 18 August 1998 (1998-08-18) column 11, line 40 - column 12, line 26 -----	1-11, 20-30
A	US 4 417 161 A (UYA MASARU [JP]) 22 November 1983 (1983-11-22) column 2, line 29 - column 3, line 11 -----	1-11, 20-30

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/031650

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2006181310	A1	17-08-2006	KR 20060092408 A	23-08-2006
US 4424460	A	03-01-1984	NONE	
US 5973507	A	26-10-1999	US 5847590 A	08-12-1998
US 6356112	B1	12-03-2002	US 2002067186 A1	06-06-2002
US 5796624	A	18-08-1998	NONE	
US 4417161	A	22-11-1983	JP 57046536 A	17-03-1982

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-11, 20-30

Circuit arrangements forming XOR and XNOR logic.

2. claims: 12-19, 31-38

Circuit layouts with contiguous electrode structure.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/031650

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.:

1-11, 20-30

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.