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(71) Applicant: INTER CORPORATION [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors: GOLDMAN, Matthew; 119 Conductor Way, Folsom, CA 95630 (US). SRINIVADAN, Balaji; 9610 Madison Avenue, #78, Fair Oaks, CA 95628 (US). CAS-TRO, Hernan; 3611 Meder Road, Shingle Springs, CA 95682 (US).

(74) Agents: TROP, Timothy, N. et al.; Trop, Pruner & Hu, P.C., Suite 100, 8554 Katy Freeway, Houston, TX 77024 (US).

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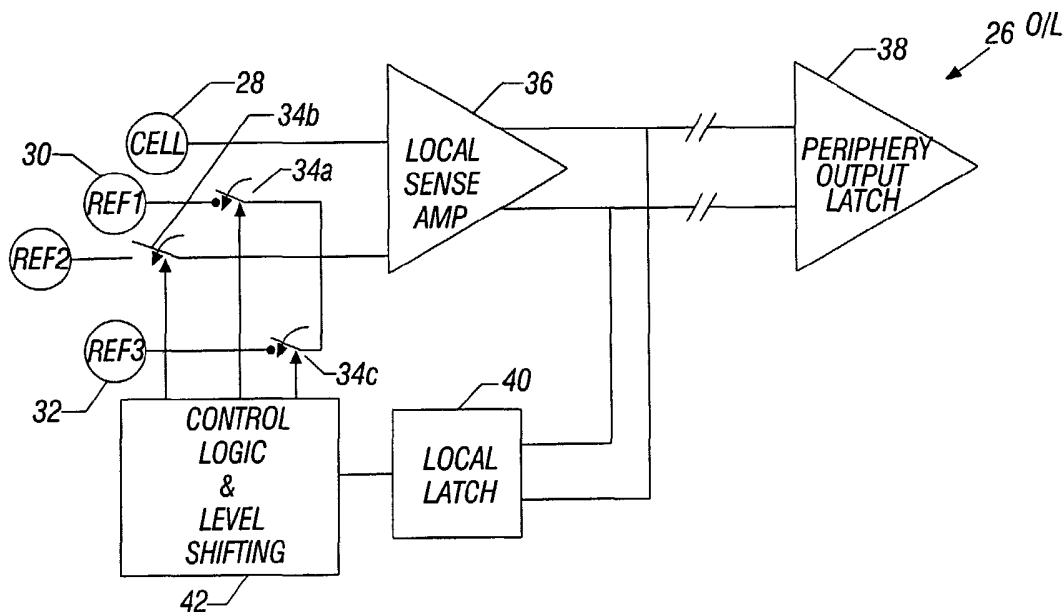
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SERIALY SENSING THE OUTPUT OF MULTILEVEL CELL ARRAYS



(57) Abstract: In accordance with one embodiment, a serial sensing scheme may be utilized to sense the information stored on a multilevel cell. The more significant bit of the information in the cell may sense initially. The more significant bit information may be used to determine which of at least two reference levels to utilize to determine a less a significant bit of the cell.

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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 03/13630

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G11C11/56 G11C7/06 G11C7/10

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 7 G11C

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, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 09, 30 July 1999 (1999-07-30) & JP 11 096770 A (SONY CORP), 9 April 1999 (1999-04-09) abstract  ---  -/--	1-16,19, 24

Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  2 December 2003	Date of mailing of the international search report  13. 01. 2004
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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, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Colling, P
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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/13630

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	OHKAWA M ET AL: "A 98 MM2 DIE SIZE 3.3-V 64-MB FLASH MEMORY WITH FN-NOR TYPE FOUR- LEVEL CELL" IEEE JOURNAL OF SOLID-STATE CIRCUITS, IEEE INC. NEW YORK, US, vol. 31, no. 11, 1 November 1996 (1996-11-01), pages 1584-1589, XP000691442 ISSN: 0018-9200 page 1586, left-hand column, paragraph 1 -right-hand column, paragraph 4 figures 6,7	1-16,19, 24
X	--- US 6 259 622 B1 (FRIED RAFAEL ET AL) 10 July 2001 (2001-07-10) column 12, line 35 -column 13, line 12 figure 11	1-14
X	--- US 5 894 436 A (OHKAWA MASAYOSHI ET AL) 13 April 1999 (1999-04-13) figures 1,4,7 column 7, line 6 - line 42 column 8, line 34 -column 9, line 9 column 9, line 63 -column 10, line 40	1,2,6, 11,12
X	--- WO 95 34075 A (INTEL CORP) 14 December 1995 (1995-12-14) page 16, paragraph 3 -page 17, paragraph 4 table 2 figure 8	1,6,15, 16,19,24
X	--- US 6 011 729 A (CHOI BYUNG-SUN) 4 January 2000 (2000-01-04)	15,16, 18,19, 22-24
Y	column 3, line 66 -column 6, line 18 figures 5,6	17,20, 21,25-31
X	--- US 2002/057595 A1 (KAI YOSHIHIDE ET AL) 16 May 2002 (2002-05-16) page 4, paragraph 66 -page 5, paragraph 69 figure 4	15,16, 18,19, 22-24
Y	--- EP 1 058 269 A (ST MICROELECTRONICS SRL) 6 December 2000 (2000-12-06) column 4, paragraph 3 -column 5, paragraph 8 figure 4	17,20, 21,25-31
A	--- US 5 594 691 A (BASHIR AMIR) 14 January 1997 (1997-01-14) column 9, line 33 -column 12, line 12 figure 7	2,7,9,13
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## 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 6 184 726 B1 (WANG CHENG-YUAN MICHAEL ET AL) 6 February 2001 (2001-02-06) column 2, line 13 -column 3, line 20 ---	4,10,14
A	EP 0 724 266 A (SGS THOMSON MICROELECTRONICS) 31 July 1996 (1996-07-31) column 1, line 1 -column 4, line 57 figure 8 ---	1-14
A	US 5 926 838 A (JEDDELOH JOE M) 20 July 1999 (1999-07-20) column 6, line 65 -column 7, line 9 -----	21,22

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/13630

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 fee, this Authority did not invite payment of any additional fee.
  
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.:  
  
1-31
  
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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-14

Readout circuit for multibit memory using low circuit area

2. Claims: 15-31

Low disturb serial sensing method for multibit memory

3. Claims: 32-40

Signal output isolation circuit for multibit memory

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/13630

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