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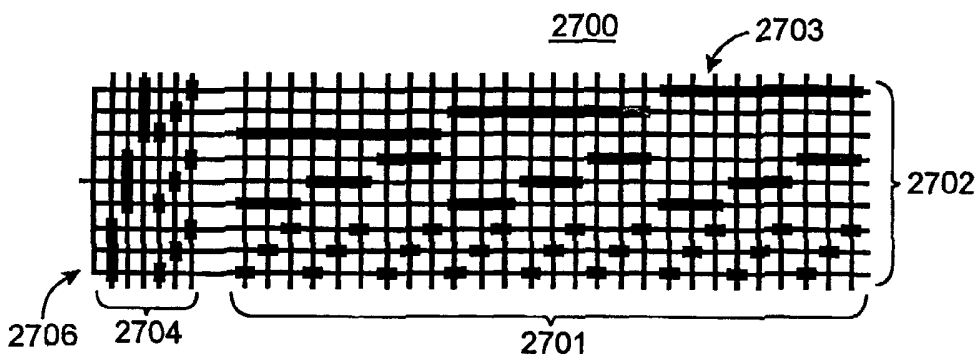
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Declaration under Rule 4.17:
— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: MICROFLUIDIC LARGE SCALE INTEGRATION



(57) Abstract: High-density microfluidic chips contain plumbing networks with thousands of micromechanical valves and hundreds of individually addressable chambers. These fluidic devices are analogous to electronic integrated circuits fabricated using large scale integration (LSI). A component of these networks is the fluidic multiplexor, which is a combinatorial array of binary valve patterns that exponentially increases the processing power of a network by allowing complex fluid manipulations with a minimal number of inputs. These integrated microfluidic networks can be used to construct a variety of highly complex microfluidic devices, for example the microfluidic analog of a comparator array, and a microfluidic memory storage device resembling electronic random access memories.

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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.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/30335

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01B1/00 F15C5/00 B81B3/00

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 B01L F15C B81B

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, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	UNGER M A ET AL: "Monolithic Microfabricated Valves and Pumps by Multilayer Soft Lithography" SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, US, vol. 288, 7 April 2000 (2000-04-07), pages 113-116, XP002192277 ISSN: 0036-8075	1-6, 11-20
A Y	the whole document figures 2A-2F	18,19 7-10
X	----- WO 02/43615 A (CALIFORNIA INST OF TECHN) 6 June 2002 (2002-06-06) page 45, line 3 - page 51, line 22	13-25
A Y	page 69, line 10 - page 72, line 25 figures 27,30-34,44A-44D,60,63,77,78 ----- -/--	18,19 7-10,26

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

"E" earlier document 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 26 October 2004	Date of mailing of the international search report 25. 02. 2005
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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 Meister, M
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/30335

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	THORSEN, TODD: "Microfluidic technologies for high-throughput screening applications" [Online] 23 September 2002 (2002-09-23), CALIFORNIA INSTITUTE OF TECHNOLOGY , PASADENA, USA , XP002302465 Retrieved from the Internet: URL:http://resolver.caltech.edu/CaltechETD: :etd-12012002-092026> [retrieved on 2004-10-25] figure 5.7 * Chapter 5 - Complex Addressable Microfluidic Arrays * -----	26
P,X	TODD THORSEN, SEBASTIAN J. MAERKL, STEPHEN R. QUAKE: "Microfluidic Large-Scale Integration" SCIENCE, vol. 298, no. 5593, 18 October 2002 (2002-10-18), pages 580-584, XP002302473 WASHINGTON, DC, USA the whole document -----	1-12, 23-26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/30335

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.:

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 - 29

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: 1-29

Microfluidic network including multiplexer

2. claims: 30-33

Microfluidic seat valve

3. claims: 34-41

Method of isolating elements of a heterogeneous sample

4. claims: 42-53

Microfluidic storage location

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/30335

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0243615	A	06-06-2002	US 2002029814 A1	14-03-2002
			AU 2866402 A	11-06-2002
			EP 1345551 A2	24-09-2003
			JP 2004526578 T	02-09-2004
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