



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification⁶ : G01L 9/00, 19/14, 13/02</p>	<p>A3</p>	<p>(11) International Publication Number: WO 99/32865</p> <p>(43) International Publication Date: 1 July 1999 (01.07.99)</p>
<p>(21) International Application Number: PCT/US98/27388</p> <p>(22) International Filing Date: 22 December 1998 (22.12.98)</p> <p>(30) Priority Data: 08/995,829 22 December 1997 (22.12.97) US</p> <p>(71) Applicant (for all designated States except US): ADVANCED MICROMACHINES INCORPORATED [US/US]; Suite 240, 11000 Cedar Avenue, Cleveland, OH 44106 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): BANG, Christopher [US/US]; 14154 Swan Lake Boulevard, North Royalton, OH 44133 (US). NAGY, Michael, L. [US/US]; 1292 St. Charles Avenue, Lakewood, OH 44107 (US). YANG, Xiaofeng [CN/US]; 27645 Bishop Park Drive #805, Willoughby Hills, OH 44092 (US). JUST, Marcus, S. [US/US]; 2574 Friar Drive, Parma, OH 44134 (US).</p> <p>(74) Agents: LONGMUIR, Jeanne, E. et al.; Calfee, Halter & Griswold LLP, 1400 McDonald Investment Center, 800 Superior Avenue, Cleveland, OH 44114-2688 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p> <p>(88) Date of publication of the international search report: 4 November 1999 (04.11.99)</p>
<p>(54) Title: MEDIA COMPATIBLE PACKAGES FOR PRESSURE SENSING DEVICES</p>		
<p>(57) Abstract</p> <p>A media compatible package (100) for a pressure sensing device is made from a non-corrosive, highly chemical resistant material. The package includes a base (105) which holds a printed circuit board (115) having a pressure sensor (18) mounted thereon. A sealing member (45) is placed on the circuit board encircling the pressure sensor and a diaphragm (30) is disposed on the sealing member. A fluid port (130) is attached to the base and compressingly engages the diaphragm creating a sealed chamber around the pressure sensor. The sealed chamber is filled with a pressure transmissive fluid (21) such as oil through a fill hole (140) provided in the printed circuit board. This configuration allows the sensor package to be easily assembled with ordinary components and provides a design where all exposed surfaces of the package can be made from a highly non-corrosive material.</p>		

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/27388

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 G01L9/00 G01L19/14 G01L13/02

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 6 G01L

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 595 939 A (OTAKE SEIICHIROU ET AL) 21 January 1997 (1997-01-21) column 1, line 21 - line 36; figure 7 ---	1, 2, 7-10, 39, 40, 45, 48
A	US 5 333 507 A (VOGLER JES V ET AL) 2 August 1994 (1994-08-02) column 3, line 42 - column 4, line 36; figure 1 ---	1, 7, 8, 10, 11, 39, 41, 42, 45, 48
A	US 5 222 397 A (KODAMA SEIKI) 29 June 1993 (1993-06-29) abstract; figure 1 ---	1, 39
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Further documents are listed in the continuation of box C. Patent family members are listed in annex.

^o 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
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Date of the actual completion of the international search 6 August 1999	Date of mailing of the international search report 20.08.99
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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 Gerken, S
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/27388

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 570 624 A (FUJI KOKI MFG) 24 November 1993 (1993-11-24) abstract; figure 4 ----	2, 40, 41, 43
A	EP 0 800 070 A (SSI TECHNOLOGIES INC) 8 October 1997 (1997-10-08) abstract; figure 2 ----	47
A	EP 0 710 826 A (MOTOROLA INC) 8 May 1996 (1996-05-08) column 2, line 15 - column 4, line 22; figure 1 ----	3-6, 44
A	US 4 695 817 A (KURTZ ANTHONY D ET AL) 22 September 1987 (1987-09-22) cited in the application abstract; figure 4 ----	1, 2, 9, 10, 39-41
X	US 4 658 651 A (LE DA HONG) 21 April 1987 (1987-04-21) column 5, line 27 - column 8, line 39; figure 1 ----	49, 50
A		51-67
X	US 5 351 550 A (MAURER DEAN J) 4 October 1994 (1994-10-04) column 5, line 11 - column 6, line 60; figures 1, 4 -----	49, 50
A		51-67

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 98/27388

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.:

1-11, 39-48, 49-67

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: 1-11,39-48

A pressure sensor package comprises a housing and a fill port in the housing which extends from an exterior of the housing to a main cavity of the housing on a side of a diaphragm opposite a pressure port.

2. Claims: 12-26

A pressure sensor package comprises first and second housing pieces adapted to receive and hold at least one diaphragm and a pressure sensing element.

3. Claims: 27-38

A pressure sensor package comprises a housing, first and second media conduits to a main cavity, pressure ports in the main cavity, and one diaphragm between each pressure port on the main cavity.

4. Claims: 49-67

A pressure sensing device comprises a pressure sensing element, a circuit board, a diaphragm and a sealing element disposed between the diaphragm and the circuit board.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/27388

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