

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
14 May 2010 (14.05.2010)

(10) International Publication Number  
**WO 2010/053792 A3**

(51) International Patent Classification:  
A61N 1/365 (2006.01) A61B 5/00 (2006.01)

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(21) International Application Number:  
PCT/US2009/062410

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(22) International Filing Date:  
28 October 2009 (28.10.2009)

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

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
61/109,434 29 October 2008 (29.10.2008) US  
12/361,977 29 January 2009 (29.01.2009) US

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(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, HR, HU, IE, IS, IT, LT, LU, LV,  
MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: TIMING COORDINATION OF IMPLANTABLE MEDICAL SENSOR MODULES

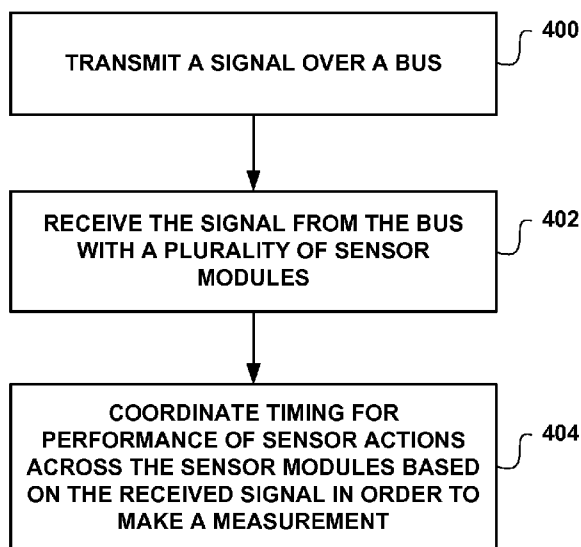


FIG. 12

(57) Abstract: In general, the disclosure is directed toward an implantable medical device that includes a plurality of sensor modules that are implanted within a patient. The sensor modules may cooperate with each other to coordinate the timing for performance of one or more sensor actions across the modules when making a measurement. Example measurements include tissue perfusion measurements, oxygen sensing measurements, sonomicrometry measurements, and pressure measurements. The coordination of the sensor modules may be controlled by a signal that is transmitted from a controller to the sensor modules via a bus. In some examples, the bus may have two wires that transmit both timing information and data information to the sensor modules. The signal may be a signal that is substantially periodic, such as a pulsed signal. In additional examples, the signal may supply operating power and timing information to the sensor modules.

WO 2010/053792 A3



**Published:**

**(88) Date of publication of the international search report:**

12 August 2010

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2009/062410

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. A61N1/365 A61B5/00				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) A61N A61B				
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				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 00/23146 A (MEDTRONIC INC [US]) 27 April 2000 (2000-04-27) abstract; figures 1,3-5 page 1, lines 5-7 page 6, line 19 - page 8, line 20 page 15, lines 6-15 page 17, line 12 - page 20, line 12	1,2,4,5, 13-15		
X	US 5 999 848 A (GORD JOHN C [US] ET AL) 7 December 1999 (1999-12-07) abstract; figures 2,4,5a,6-8 column 1, lines 5-16 column 3, lines 10-29 column 6, line 62 - column 7, line 53 column 9, lines 24-41 column 10, line 13 - column 12, line 30 column 16, line 5 - column 17, line 53 ----- -/--	1-5, 13-15		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.                 </td> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> See patent family annex.                 </td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> 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 "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  <h2 style="text-align: center;">12 February 2010</h2>	Date of mailing of the international search report  <h2 style="text-align: center;">30/06/2010</h2>			
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  <h2 style="text-align: center;">Molina Silvestre, A</h2>			

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2009/062410

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 1 764 034 A (PACESETTER INC [US]) 21 March 2007 (2007-03-21) the whole document -----	1-5, 13-15.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2009/062410

## 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.:

see annex

### 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-5 and 13-15

An implantable medical device (IMD) comprising means for transmitting a signal over a bus, means for receiving this signal and means for coordinating timing for performance of sensor actions, wherein the signal is a substantially periodic pulse signal.

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2. claims: 1, 2 and 5-7

An IMD comprising means for transmitting a signal over a bus, means for receiving this signal with a plurality of sensor modules and means for coordinating timing, wherein the sensor modules comprise light emitter and detector modules.

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3. claims: 1, 2 and 8-12

An IMD comprising means for transmitting a signal over a bus, means for receiving this signal with a plurality of sensor modules and means for coordinating timing, including specific arrangements for achieving efficiency of operation.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No <b>PCT/US2009/062410</b>
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Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
WO 0023146	A	27-04-2000	DE 69923989 D1	07-04-2005
			DE 69923989 T2	06-04-2006
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			EP 1030715 A1	30-08-2000
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EP 1764034	A	21-03-2007	NONE	