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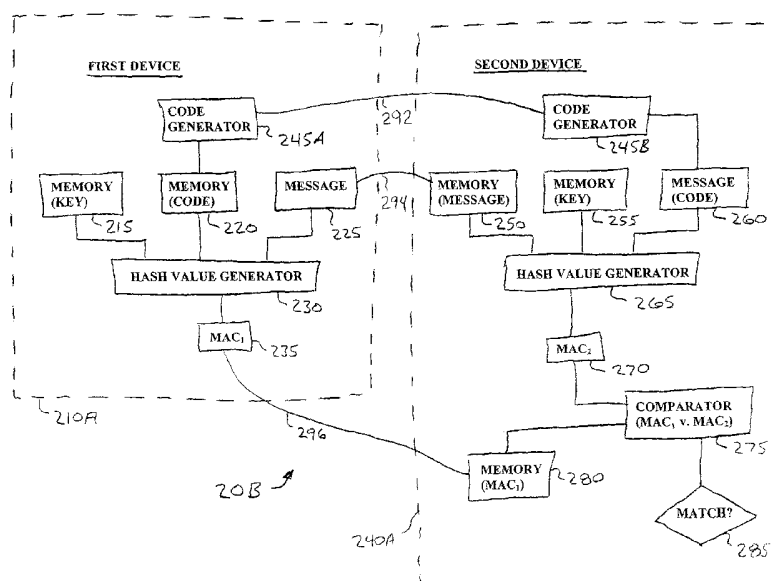
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[Continued on next page]

(54) Title: CRYPTOGRAPHIC AUTHENTICATION FOR IMPLANTABLE MEDICAL DEVICE TELEMETRY



(57) Abstract: Integrity of a wirelessly telemetered message communicated between an implantable medical device and an external programmer is authenticated by encoding the message. The message is encrypted based on a random number or time stamp and a secret key. The message is authenticated by encryption and decryption or by executing a hash function.



**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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17 November 2005

# INTERNATIONAL SEARCH REPORT

International Application No  
US2005/008521

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04L9/00 A61N1/372

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 H04L A61N

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, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2003/074036 A1 (PRUTCHI DAVID ET AL) 17 April 2003 (2003-04-17) paragraph '0047!	1-18
Y	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 05, 12 May 2003 (2003-05-12) & JP 2003 022008 A (SONY CORP), 24 January 2003 (2003-01-24) abstract	1-18
Y	US 2003/114897 A1 (VON ARX JEFFREY A ET AL) 19 June 2003 (2003-06-19) paragraphs '0035!, '0074!; figure 1	19-59
Y	US 5 737 419 A (GANESAN ET AL) 7 April 1998 (1998-04-07) column 5, paragraph 2	19-24, 31-46
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☒ 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

21 September 2005

Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

International Application No  
JS2005/008521

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2003/065919 A1 (ALBERT ROY DAVID ET AL) 3 April 2003 (2003-04-03) paragraph '0065! - paragraph '0072! -----	25-30, 47-59
A	US 2003/159048 A1 (MATSUMOTO TSUTOMU ET AL) 21 August 2003 (2003-08-21) paragraph '0050! -----	1-59
A	US 6 028 527 A (SOENEN ET AL) 22 February 2000 (2000-02-22) column 18, paragraph 1 column 21, line 1 - line 5 -----	1-59
A	US 2002/120838 A1 (ABDULKADER BARBIR) 29 August 2002 (2002-08-29) paragraphs '0006!, '0018! -----	1-59
A	US 5 898 397 A (MURRAY ET AL) 27 April 1999 (1999-04-27) column 3, paragraph 8 -----	1-59

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2005/008521

### Box 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 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 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.:

#### 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: 1-18

A device with communications of high data integrity achieved by hash value comparison.  
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2. claims: 19-24, 31-46

A system with communications of high secrecy and immunity to replay attacks achieved by the use of encryption in combination with a code.  
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3. claims: 25-30, 47-59

A system with communications of high data integrity and immunity to replay attacks achieved by use of hash value comparison in combination with a code.  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

US2005/008521

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003074036	A1	17-04-2003	NONE	
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