

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 May 2002 (30.05.2002)

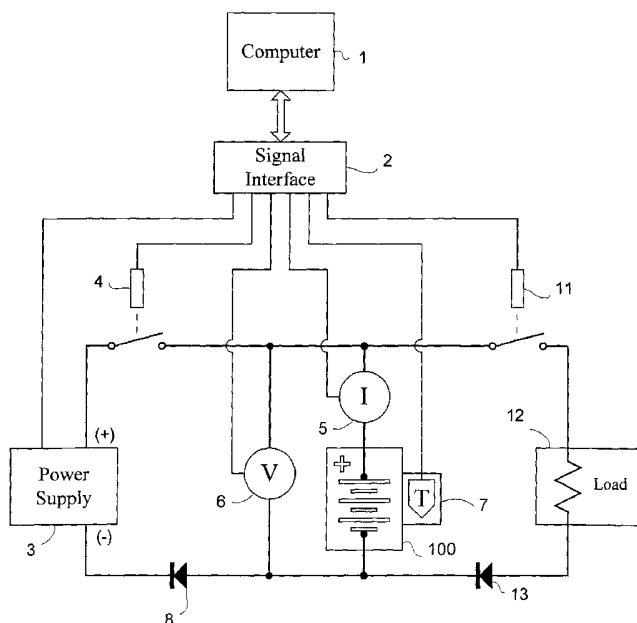
PCT

(10) International Publication Number
WO 02/042786 A3

- (51) International Patent Classification⁷: G01R 31/36, H02J 7/00
- (74) Agents: ROGER, H., Criss, Esq. et al.; Honeywell International Inc., 101 Columbia Avenue, P.O. Box 2245, Morristown, NJ 07960 (US).
- (21) International Application Number: PCT/US01/43735
- (81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 19 November 2001 (19.11.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 09/721,003 22 November 2000 (22.11.2000) US
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, 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, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant: HONEYWELL INTERNATIONAL INC. P.O. Box 2245 [US/US]; 101 Columbia Avenue, P.O. Box 2245, Morristown, NJ 07960 (US).
- (72) Inventors: GUIHEEN, James, V.; 13 Rosemont Avenue, Madison, NJ 07940 (US). PALANISAMY, Thirumalai, G.; 14 Canterbury Way, Morristown, NJ 07960 (US). SINGH, Harmohan; 35 Sherbrook Drive, Rockaway, NJ 07866 (US).
- Published: — with international search report
- (88) Date of publication of the international search report: 24 October 2002

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR DETERMINING THE STATE OF CHARGE OF A LITHIUM-ION BATTERY



(57) Abstract: Computer-assisted methods for determining the state of charge of a specific lithium ion battery (100), without the need for charging and discharging the battery, by utilizing look-up tables or algorithms, within a computer (1) which store the relationships of state of charge to open-circuit voltage or to ramp-peak current, or to both for that type of specific lithium-ion battery (100) to determine the state of charge for that specific lithium-ion battery (100).



WO 02/042786 A3



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 01/43735

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G01R31/36 H02J7/00		
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 G01R H02J		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 725 784 A (PELED ET AL.) 16 February 1988 (1988-02-16)	7,9
Y	column 2, line 33 - line 39; figures 4,5,7,8	8
Y	--- FR 2 734 061 A (THOMSON CSF) 15 November 1996 (1996-11-15)	8
A	page 1, line 31 -page 2, line 12 page 6, line 17 - line 19	1
X	--- US 6 064 182 A (EGUCHI) 16 May 2000 (2000-05-16)	7
A	column 5, line 8 - line 15; figures 1,4 --- US 6 111 389 A (ARANOVICH ET AL.) 29 August 2000 (2000-08-29)	10,16,19
abstract; figures 1A,2,3 -----		
<input type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> 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 <p align="center">30 July 2002</p>	Date of mailing of the international search report <p align="center">06/08/2002</p>	
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 <p align="center">Iwansson, K</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 01/43735

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4725784	A	16-02-1988	EP	0323539 A1	12-07-1989
			IL	69750 A	31-01-1988
FR 2734061	A	15-11-1996	FR	2734061 A1	15-11-1996
US 6064182	A	16-05-2000	JP	11007984 A	12-01-1999
US 6111389	A	29-08-2000	NONE		