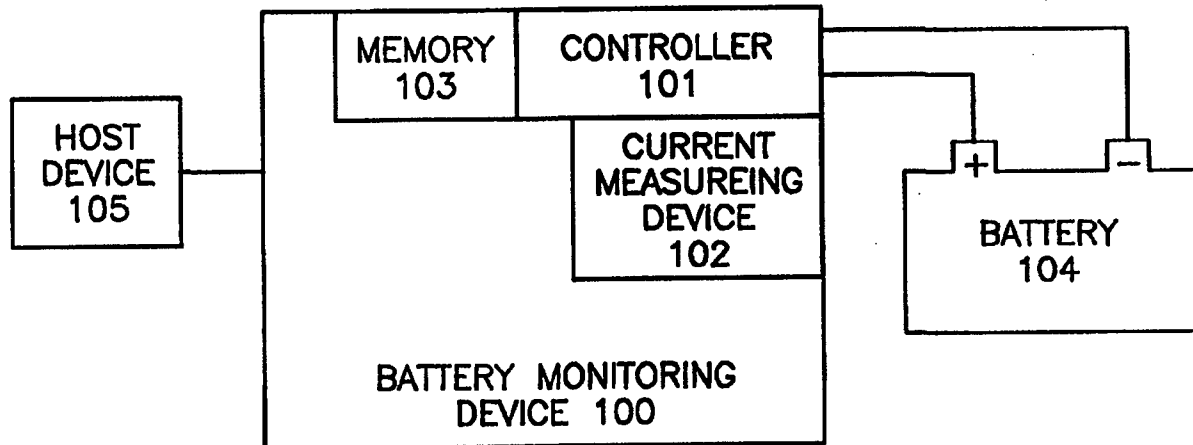




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>6</sup> : <b>G01R 31/36</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 95/31733</b> (43) International Publication Date: 23 November 1995 (23.11.95)</p>
<p>(21) International Application Number: PCT/US95/05826 (22) International Filing Date: 9 May 1995 (09.05.95) (30) Priority Data: 08/242,319 13 May 1994 (13.05.94) US (71) Applicant: APPLE COMPUTER, INC. [US/US]; 1 Infinite Loop, Cupertino, CA 95014 (US). (72) Inventors: AUSTIN, Steven, E.; 43983 Cerro Court, Fremont, CA 94539 (US). BLANC, James, J.; 832 W. Hillsdale Boulevard, San Mateo, CA 94403 (US). TOWNSLEY, David, B.; 10166 Danube Drive, Cupertino, CA 95014 (US). KIM, Stephen, J.; 6239 Blossom Avenue, San Jose, CA 95123 (US). (74) Agents: SCHELLER, James, C. et al.; Blakely, Sokoloff, Taylor &amp; Zafman, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025-1026 (US).</p>	<p>(81) Designated States: AM, AT, AT (Utility model), AU, BB, BG, BR, BY, CA, CH, CN, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TT, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 21 December 1995 (21.12.95)</p>	

(54) Title: METHOD AND APPARATUS FOR MONITORING DISCHARGE OF A BATTERY DEVICE



(57) Abstract

A novel battery monitoring device is described. The monitoring device determines amount of battery self-discharge, determines amount of battery discharge from a monitoring circuit, determines amount of battery discharge from a host device when the host device is in a first power consumption mode, and determines amount of battery discharge from the host device when the host device is in a second power consumption mode. The first mode causes greater discharge of the battery during a given period of time than the second mode.

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**INTERNATIONAL SEARCH REPORT**

Internal Application No  
PCT/US 95/05826

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 G01R31/36

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 G01R

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.
Y	WO,A,92 15893 (ROBERT BOSCH) 17 September 1992 see abstract ---	1-20,29,30
Y	US,A,5 248 929 (BURKE) 28 September 1993 see column 3, line 13 - line 31 ---	1-20,29,30
A	US,A,4 866 471 (IKUTA) 12 September 1989 see figure 1 ---	5
A	US,A,5 268 845 (STARTUP ET AL.) 7 December 1993 see claim 1 -----	1

Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search  31 August 1995	Date of mailing of the international search report  20. 11. 95
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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  HOORNAERT, W
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 95/05826

## 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:

1. claims 1-30: method and device for monitoring a battery
2. claim 31 : low power inverter
3. claims 32-40: oscillator

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.:

1-30

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 95/05826

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9215893	17-09-92	DE-A- 4106725	03-09-92
US-A-5248929	28-09-93	JP-A- 6021867 US-A- 5333176	28-01-94 26-07-94
US-A-4866471	12-09-89	JP-A- 62223739 JP-A- 62223740	01-10-87 01-10-87
US-A-5268845	07-12-93	US-A- 5365453	15-11-94